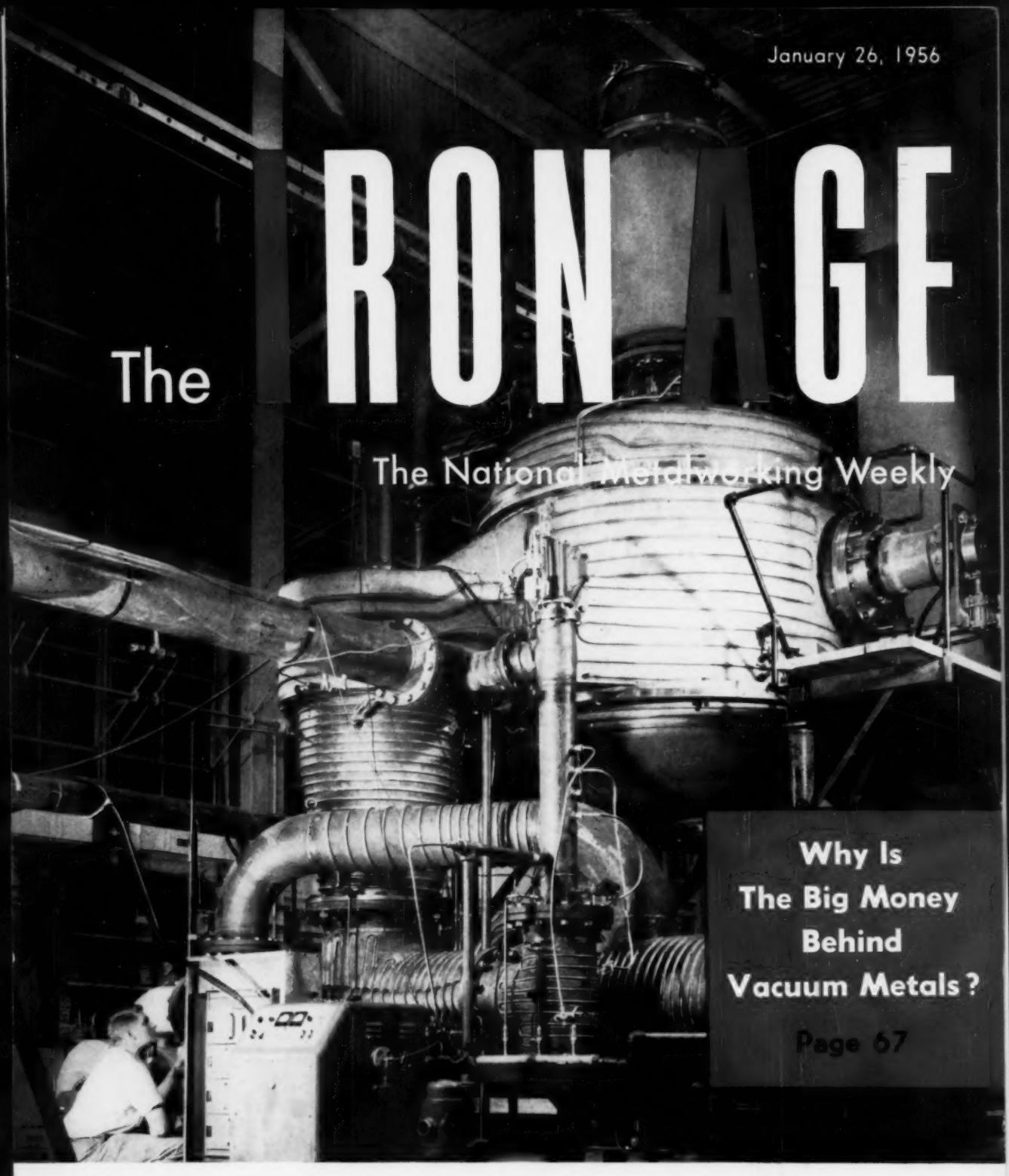
January 26, 1956

The IRON AGE

The National Metalworking Weekly



Why Is The Big Money Behind Vacuum Metals?

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Piggy-backing Twist Spawns A New Industry

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Take guesswork out of nut tightening 76
Will power shortage hurt aluminum? . . 53

Digest of the Week—Page 2

Chromel-Alumel

THERMOCOUPLE ALLOYS

FOR ACCURACY!

Chromel-Alumel thermocouple alloys are unconditionally guaranteed to register true temperature—e.m.f. values within close specified limits . . . ±4°F. from 0° to 530°F.; ±¾% at operating temperatures from 531° to 2300°F.

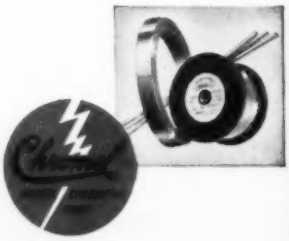
FOR DURABILITY!

They're highly resistant to oxidation, extremely sensitive to temperature variations. And they maintain their fine accuracy over a wider range of temperatures for far longer periods of time than any other base metal material.

FOR ECONOMY!

Despite their finer accuracy, higher temperature range, and longer useful life, Chromel-Alumel thermocouple wire costs the user no more than ordinary base metal materials . . . and in many cases, they actually cost less!

Ask for them by name! Your instrument manufacturer or pyrometer service company can supply your immediate requirements for plain or insulated wire and assembled couples, as well as Chromel-Alumel *extension* lead wire to eliminate "cold-end" errors. So ask for them by name . . . "Chromel-Alumel" thermocouples . . . the trade-name you can trust!



Chromel-Alumel thermocouple alloys are produced exclusively by

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High Style in Steel

Many's the elegant home that is graced with furniture fabricated from hot-rolled carbon-steel bars.

Sturdy and durable, steel furniture has long been popular in the garden and on the porch, as well as in business offices.

In recent years, however, the artistic creations of such manufacturers as John B. Salterini Co., Inc., have brought high style to steel furniture, with the result that it has come into wide use in the home.

In Salterini's New York City workshops artisans bend, hammer and weld Bethlehem carbon-steel bars into creations that are as fashionable as they are functional. Some designs are modern, with clean, flowing lines. Others, such as the gracious French Provincial group shown above, are richly ornamented adaptations of traditional designs.

Bars for industries are hot-rolled on the Bethlehem bar mills at Lackawanna, N. Y., and Johnstown, Pa.

The furniture industry is but one of the innumerable active and growing industries whose combined requirements have created an unprecedented peacetime demand for hot-rolled carbon-steel bars. We're doing our best to meet this demand, all the while maintaining our customary quality standards.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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BETHLEHEM STEEL

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

January 26, 1956—Vol. 177, No. 4

The IRON AGE

Digest Of The Week In Metalworking

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NEWS DEVELOPMENTS

PIGGY-BACKING CREATES A NEW INDUSTRY P. 27

Piggy-backing on the railroads is evolving into a new industry based on specialized containers and materials handling equipment. New approach may develop into bigger business than trailer-on-flatcar.

HOW TO IMPROVE YOUR STOREKEEPING P. 30

Once neglected by management, industrial storekeeping is a field that offers wide opportunity to cut costs and boost efficiency. Increasing complexity of modern business puts storekeeping in increasingly important category.

AUTO DEALERS WANT HELP FROM WASHINGTON P. 31

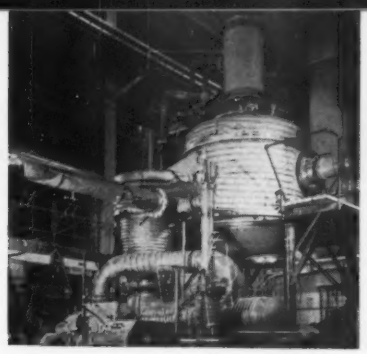
Senate subcommittee will look into dealer problems in new session. Survey discloses dealers want laws to protect them from bootlegging and discount selling. Phantom freight is also a concern of farflung dealers who have to add freight to car price.

SEARCH FOR IRON ORE COVERS WORLD P. 32

Rapid increases in world steel production keep industry in constant search for ore to keep furnaces pouring hot metal. No serious shortage is in prospect, but quest is more intense. Lump ore in Dominican Republic mined by Barium Steel Corp.

GUIDED MISSILES GET BIG BUDGET PUSH P. 49

Administration is asking Congress for $1.3 billion to develop and build guided missiles. Big jump in missile spending will bring many more contractors into the picture, may mean a change in the air defense policy.



THOUSAND lb Consoldated-Vacuum-built furnace at Carboloy Dept., General Electric Co., symbolizes swelling vacuum metals interest. See story P. 67

DEFENSE DEPT. USES TOOLING RESERVE P. 55

If you're using machine tools for defense work, you may be able to borrow defense reserve tools. New reserve programs means modification of Vance Plan and utilization of tools for current needs. Emphasis is now on current production, less on building big reserve.

FEATURE ARTICLES

WHY IS THE BIG MONEY BEHIND VACUUM METALS? P. 67

Whether you produce metals or fabricate them, you'll want to keep tabs on vacuum metallurgy. Are vacuum-processed alloys so much better than regular grades? Who melts these materials? Who makes the equipment? What's the difference between vacuum melting and vacuum degassing? Here are answers to these and other questions to bring you up to date.

ASSEMBLE FIRST FOR LOWER PAINTING COSTS P. 73

Spraying auto bodies on one line, such components as front ends, fenders, etc., on other lines, has been common industry practice. Chrysler finds that first assembling, then painting body as a unit produces better color matching, avoids marring of finishes in subsequent assembly. New setup is largely automatic.

TORSION BARS CONTROL TORQUE IN NUT TOOLS P. 76

Do you want close, repetitive torque control in a high speed nut running tool? These new ones use adjustable torsion bars to hold torque within a 15 pct total variation from your required mean figure. Tools work at full speed and power, shut themselves off when preset torque is reached.

DESIGN FOR TOP FABRICATING ECONOMY P. 78

Squeezing maximum dollar value out of high priced raw materials such as titanium sheet takes more than design competence. Besides considering material's physical properties, design must reflect most economical manufacturing methods.

PERMANENT DIES PARE STAMPING COSTS P. 82

For producing hammer stampings in limited quantities, lead-Kirksite dies are among the most practical low-cost tools available. For longer runs, this West Coast aircraft maker turned to lead-Meehanite tooling. Costs of recasting tools are eliminated, stainless steel parts no longer have to be dezinced, galling problems are reduced. Also, dies can be flame-hardened locally.

MARKETS AND PRICES

STEEL WAREHOUSES TAKE WARY VIEW OF BOOM P. 29

Despite one of their best years ever, steel warehousemen are moving slowly on expansion. Need for more space has some expanding or moving but no big move has developed.

COAL COMEBACK IS ON SOLID FOOTING P. 36

Soft coal industry has made a good comeback from depression of 1954. And the industry is looking forward to a period of growth now that lost markets are being offset by pickup in other directions, chiefly power.

IS GENERAL MOTORS RUNNING SCARED? P. 44

Harlow Curtice, GM president, expresses concern over credit controls and public's interest in 1957 models at neglect of 56's. But GM will spend another $1 billion this year, $250 million of it not announced previously. Ford stock climbs after first sale to public.

DON'T TAKE STEEL EASING TALK SERIOUSLY P. 107

All this talk about an easier steel market may throw you off guard—if you believe it. Facts are that there has been no easing and none is likely for some time. Best advice is to keep up the pressure.

ALUMINUM IS WORRIED ABOUT WATERPOWER P. 117

Lack of new dam starts is giving Far West primary aluminum producers the jitters. Not only is it restricting their expansion, it is also holding down the growth potential of some of the main local markets.

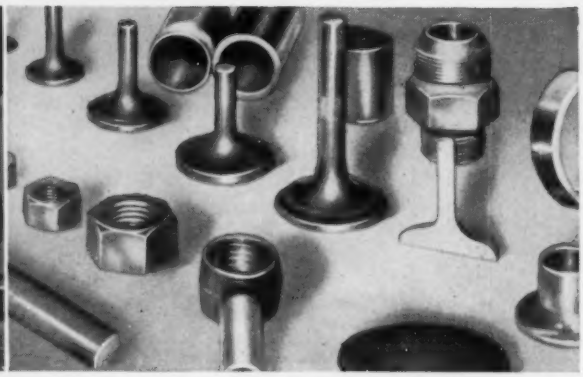
NEXT WEEK:

IS YOUR PLANT PROTECTION PAYING OFF?

Plant security forces cost money to operate, are responsible for millions in equipment. If you think of guards just as men who check passes at the gate, you may be missing vital services. Here's a close-up look at how some plants evaluate guard forces, what men do hour by hour.

SPECIAL FEATURE: GETTING MORE FOR YOUR STAINLESS DOLLAR

Stainless Type 304 is clearly a far cry from plain carbon steel. What is less obvious is that many of the controlling factors for purchasing stainless steels are equally distinct. Stainless buying, fabrication, engineering, all call for a fresh approach. Here's how to get more for your money.



Mounted so its "eye" is only 4 inches from the work, Rayotube sights between heating coils directly on work surface. Speedomax controller records work temperature; automatically shuts off induction heater.

Typical of parts forged by Super Alloy are nuts and bolts for jet engines, chemical vats and pipe lines, valves for diesel engines, automobile tie-rods and initiator chambers to trigger the ejection seats of jet aircraft.

HEATING BY INDUCTION?

Let "Work Temperature" be your guide!

"Heat It Right and You Can Forge It Right!" says John E. Connolly, President of Super Alloy Forge, Inc., Hamburg, Michigan and a pioneer in forging such materials as titanium, zirconium, and the various alloys of cobalt, tungsten, chromium and other expensive metals.

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If, like Super Alloy Forge, you are presently heating by induction or contemplating it in the future, either experimentally or in an automated production line, this Rayotube-Speedomax combination may be your answer to accurate temperature control . . . your key to reproducible results on a continuous production basis. To investigate just write us at 4956 Stenton Ave., Phila. 44, Pa. and ask for Folder NS3(2).

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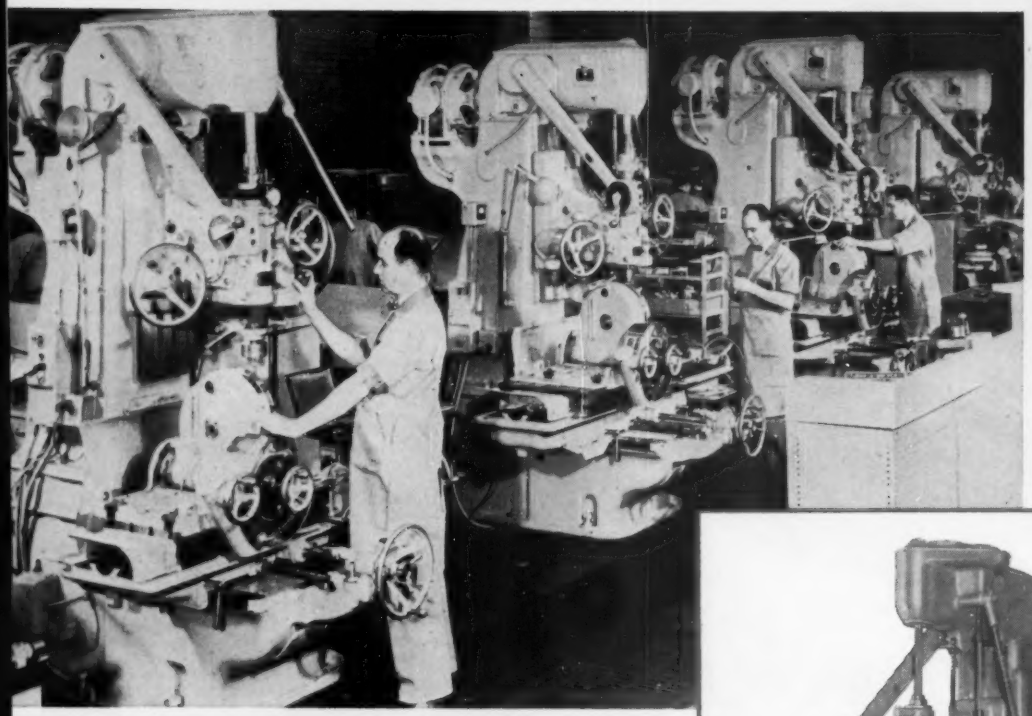
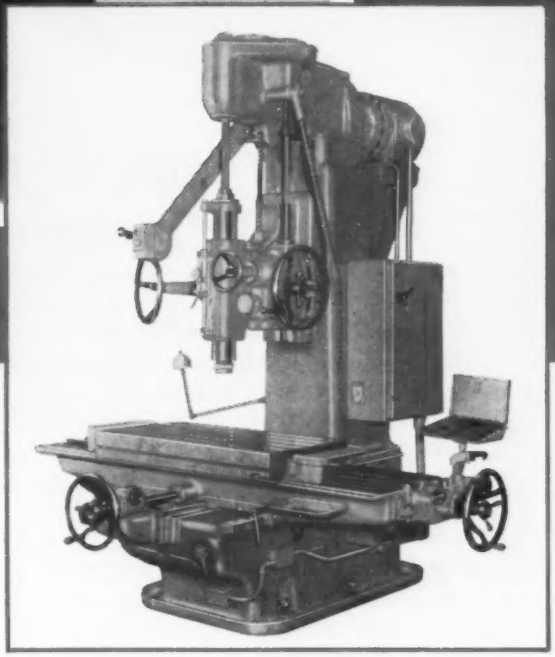


A section of the Woodward Governor Company plant in Rockford, Illinois showing a line of four P&W No. 2A End-Measure Jig Borers equipped with P&W Precision Tilting Rotary Tables.

WOODWARD GOVERNOR COMPANY USES



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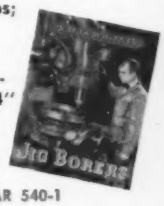
THE No. 2A—practical size for most shops; table 22" x 44"

also **THE No. 1 1/2B**—compact and versatile; table 12" x 24"

THE No. 3B—large, powerful; table 24" x 54"



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To help you select the best cold finished bar for each application, we have just published a simplified guide showing the comparative strength, cost, machinability, workability, etc. of all commonly used types. Write for your copy and call Ryerson when you need high quality cold finished bars.

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BPA NBP

EDITORIAL

Are You Budgeting the Budget?

• THEY USED TO SAY "as certain as death and taxes." Now it looks as if death will take a back seat and they will say "as certain as taxes." That is one interpretation you can take from all the facts, figures, guesses and revisions in the Federal Budget.

It is good that we are likely to have a surplus this fiscal year and next. It is significant, too. In only three years during the past 25 has the Federal Budget been balanced. This may be the fourth time. The President's budget is serious enough to cause us to change some of our cherished beliefs.

Leaving the figures to the statistical doodlers and the chart-makers, let's see what real impact the message carries. Certainly we are not going to have steep cuts in taxes either this year or next year. And if business should not be up to Treasury estimates, then we may not have a tax cut at all. Or if we do have one it may not last too long.

The general idea a few years ago was that we would be able to cut non-defense—and even defense—expenses substantially. Some people cried in the wilderness that the state of the world did not make this so simple. But now we know the score.

The present budget is up over this year's, both in defense and non-defense expenses. Also, we are running out of appropriations and must ask for more new money each year because carryovers are becoming thinner. As each year of the next five goes by, defense costs are not coming down—and it is doubtful if other government spending will be cut significantly.

Much as you might like to see the debt reduced and taxes drastically cut, it doesn't look as though that would happen in the near future. Your sales and production plans must take into account all cost factors. Taxes are a cost of doing business. Don't assume big new economies are coming in government. They aren't.

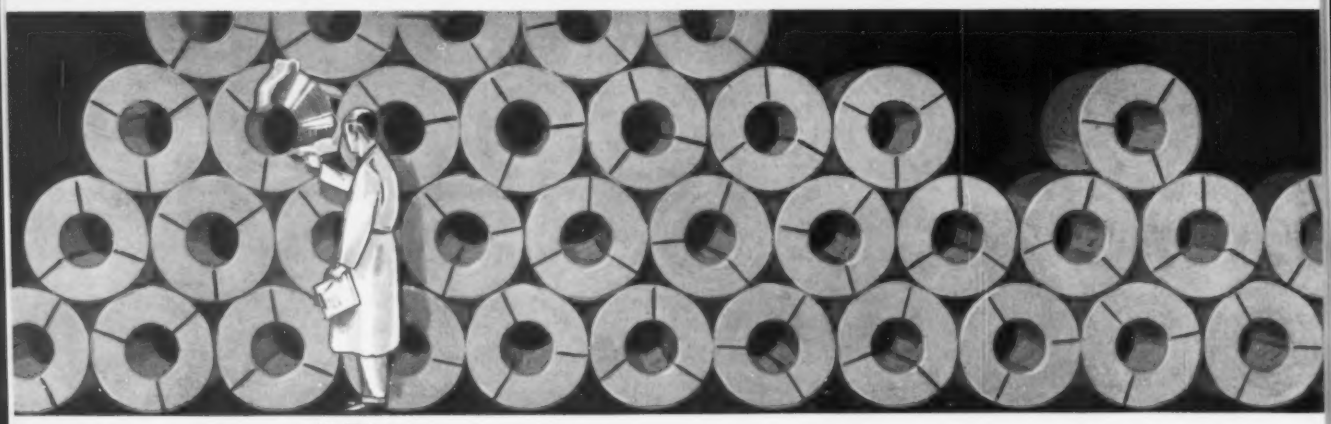
We are attempting to have our cake and eat it too. This is a delicate job. We need a strong defense against Communism. But we need a strong domestic economy to support defense. This costs money.

Yes! You must budget the Budget in your industrial thinking.

Tom Campbell

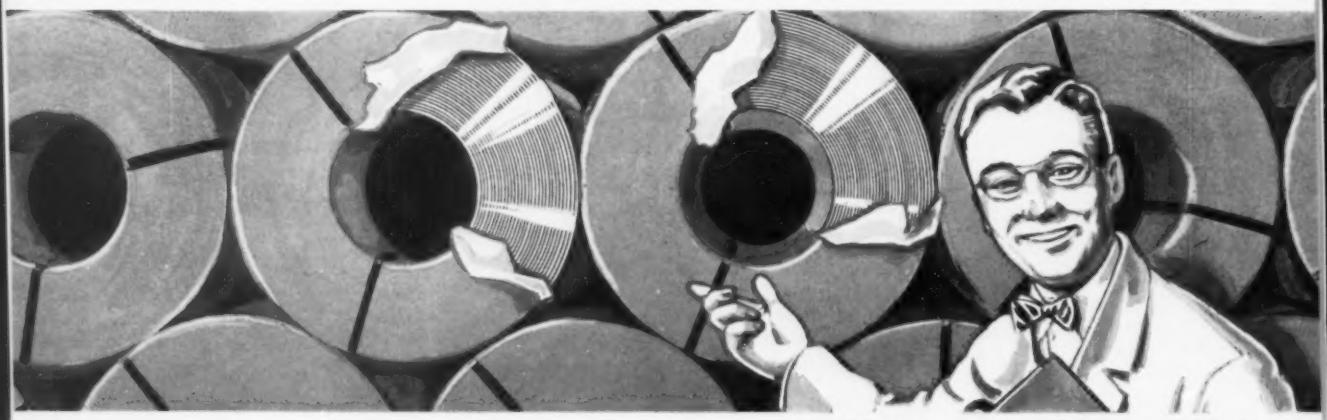
EDITOR-IN-CHIEF

Assured uniformity...



coil...

after coil...



after coil!

After the correct steel for the application has been determined the most important service a mill can render a customer is to make certain every pound of steel delivered meets specification.

The ability to assure uniformity, coil after coil, is a big reason why Sharon today is supplying more customers than at any other time in their 52-year-old history.

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dear editor: *letters from readers*

Under-Priced Steel

Sir:

Following is a presentation of a steel industry economic problem which deserves some immediate attention, in my opinion.

This problem concerns nearly every producer of aluminum killed low and medium carbon, carbon steel in the form of billets and bars. It is concerned with their economic difficulty due to high conditioning costs and low shipped yield. These high costs and relatively low yields originate with the buyers of low and medium carbon, plain carbon steel who specify the "fine grained" type.

In order to meet this requirement it is necessary for the melt shop to furnish a heat to which a critical amount of aluminum has been added as a final deoxidizer. This amount is usually one to two pounds of aluminum per ton of steel. This results not only in a heat which will be "fine grained" when carburized and slow cooled at 1700°F but one in which the sulphur is present as an intergranular film type sulphide which makes the heat "hot short" in rolling with a consequent greatly increased number and size of surface defects on blooms and billets.

This marked increase in surface defects results in a heavy increase in conditioning costs and decreased yield. It is aggravated by low carbon, higher sulphur, low manganese, special shop conditions of ingot handling and heating but the basic problem is one of aluminum deoxidation of carbon steel and its effect on the sulphide type. There is plenty in the literature to support this statement and to show that usually one of the most difficult specifications for the steel mill to meet economically is the one requiring that it produce "fine grained" carbon steel.

In view of the extra difficulties and costs involved in producing "fine grained" carbon steel it would seem to me that all aluminum killed low and medium carbon, plain carbon steels should carry an "alloy type" extra to help compensate.

It is my strong opinion, based on a long experience with all grades of carbon steel, especially those to be heat treated, that the specification of "fine grained" for such steels is quite wrong and based on the wrong premises.

I am certain that a very careful study of SAE 1020, for instance, will develop the fact that when it comes to machineability, hardenability, tube making, case hardening, and finishing, the silicon killed grade is much to be preferred to the aluminum killed "fine grained" type.

If there is any doubt in your mind that aluminum killed "fine grained" plain carbon steels should not carry an extra at least equivalent to the standard alloy extra, check the difficulties being met in the industry in getting such steel ready to ship as billets and bars. *H. W. McQuaid, Cleveland.*

Kudos

Sir:

Enclosed find cut-outs of two interesting items, razor bladed from my favorite magazine, THE IRON AGE—issue of December 15. One refers to invention of the K-square, the other to a new aircraft braking system.

Where can I obtain more information about these items?

I don't know how you manage to keep far ahead of all the other journals — but boy, you sure do! *W. H. Evans, Hofmann Industries, Inc., Sinking Spring, Pa.*

The K-square is a Junior Achievement project. J.A.'s headquarters are at 345 Madison Ave., N. Y. 17. The brake details were recently released by the Society of British Aircraft Constructors, 32 Savile Row, London, W. 1.—Ed.

DON'T GIVE ME THAT!

YOU CAN'T BEAT GARRETT SERVICE

I'm not a wise guy, but I do know about the service these Garrett plants give you. Seems hard to believe. Those fellows bend over backwards to help you out in an emergency. And their regular service means you always get deliveries when promised ... sometimes before.

Of course, when it comes to quality they are tops on lock washers, flat washers, spring washers, hose clamps, stampings and assemblies. They have three plants equipped with the most modern high-speed automatic machinery to turn out billions of parts to exact specification . . . complete heat treating, plating and finishing facilities. If you don't believe me, next time send your order into Garrett. You'll see why their customers say YOU CAN'T BEAT GARRETT.

LOCK WASHERS
FLAT WASHERS
HOSE CLAMPS
STAMPINGS

Manufactured by

GEORGE K. GARRETT CO., Inc.
Philadelphia 34, Pa.

Garrett
OF PHILADELPHIA

Traveloader placing heat-exchanger tubes on "Christmas Tree" racks to conserve yard storage space.

Traveloader... solves handling of bulky, heavy loads

Here is a revolutionary new material handling machine designed expressly for long, unwieldy awkward loads. It picks up loads from the side, carries them securely on the truck deck, and stacks them to a height of 12 feet. It operates indoors or outdoors, in 10 foot aisles, over paved or unpaved roadways—and over highways at speeds up to 30 MPH!

Traveloader is available with gas or diesel powered engine, in 10,000 and 12,000 pound capacities. Write for descriptive bulletin No. 1360.

No other ONE machine offers these features:

1. **A *ONE MAN* operated lift truck and transporter.**
2. **SIDE LOADING for straight line pick-up and delivery.**
3. **CARRIES LOADS equally distributed over two axles and four pneumatic-tired wheels.**
4. **TRAVELS with payload up to 30 MPH.**
5. **STACKS LOADS 12 feet high from 10 foot aisles.**

Airplane wings crated for shipment are easily handled by Traveloader.

Traveloader with master pallet and roller conveyor speeds loading of aircraft.

Baker®
handling equipment

THE BAKER-RAULANG COMPANY
1227 WEST 80th STREET • CLEVELAND 2, OHIO

Subsidiary of Otis Elevator Company

5T6

fatigue cracks

by William M. Coffey

Inside Iron Age

We're very proud of our new cover. We're also pretty well steamed up this week about our cover story, on the new cover—"Why Is The Big Money Behind Vacuum Metals?" In recent years this has been a hot subject and just lately it's hotter than ever.

Metallurgical Editor Paul Unterweiser visited plants of major vacuum equipment producers and users to obtain the latest developments of vacuum melting. We've run articles on vacuum melting before—have kept our eye on it*—but Paul's story probes deeper than the rest and puts the whole jig-saw puzzle together. It's a story that the staff has been working on for four months and it describes all processes, installations and techniques. So all we can say is read it, particularly if you're in steel and nonferrous metal producing. You will sooner or later have to seriously consider vacuum melting.

**(We recently secured a bibliography containing over 160 references to vacuum metallurgy (1945-1955). Prepared by a Navy Dept. metallurgist, it shows that* THE IRON AGE *has carried more articles and more pages on vacuum metallurgy than any other magazine. This bibliography does not appear with the article—too long—but will be offered free to readers.)*

* * *

We think we'd be remiss, too, if we didn't tell you about another outstanding job Paul Unterweiser has already done and is continuing to do in a series that starts next week. Paul is responsible for "How to Get More for Your Steel Dollar" which appeared last October and for which we have received over 3,000 reprint requests. The Bulletin of the National Association of Purchasing Agents said ". . . be sure to read the splendid article of "How to Get More for Your Steel Dollar." Paul Unterweiser, Metallurgical Editor of IRON AGE, is to be complimented on a very thorough job in a tough field."

For next week's issue Paul has prepared the first in a series of articles on "How to Get More for Your Metalworking Dollar." Directed towards everybody in purchasing, engineering and production, the first for the new series will be "How to Get More for Your Stainless Steel Dollar." This is a hard-talking series on how to stretch the old buck, that in coming issues will review best practices in tooling, materials handling, non-destructive testing, welding, metal finishing and metallurgy.

Puzzlers

To quote from C. W. McKinley, ". . . this is one of those trick questions (Dec. 22 puzzler). Under no condition can there be more wine in the water—conversely there cannot be more water in the wine." Winners: C. Ritter, Brumley-Donaldson Co.; George W. Frederick, Republic Steel; John Herb, Pittsburgh; John Homer, Norman Chase, Dave Groman and Jack McCallum of the Iron Age Puzzle Club, Collins Radio Co.; Sarie and Charlsie are wrong, but the rest of the Club is right at General Steel Castings; Bob Castle, Hoover Co.; V. M. Johnston, Appalachian Coals, Inc. (and many thanks, Mr. Johnston for the ACI Bulletin).

New Puzzler

Caleb Flerk has three cards. One black on both sides, one white on both sides and one white on one side and black on the other. He puts the cards in a hat and a blindfold on himself. After removing one of the cards and placing it on the table he removes his blindfold and sees that the top of the card is black. What are the odds that the bottom side of the card is black, too?

WARD STEEL CO.

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of

BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

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Phone: Grove Hill 6-2600
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Phone: Gaspee 1-5573, 1-8573

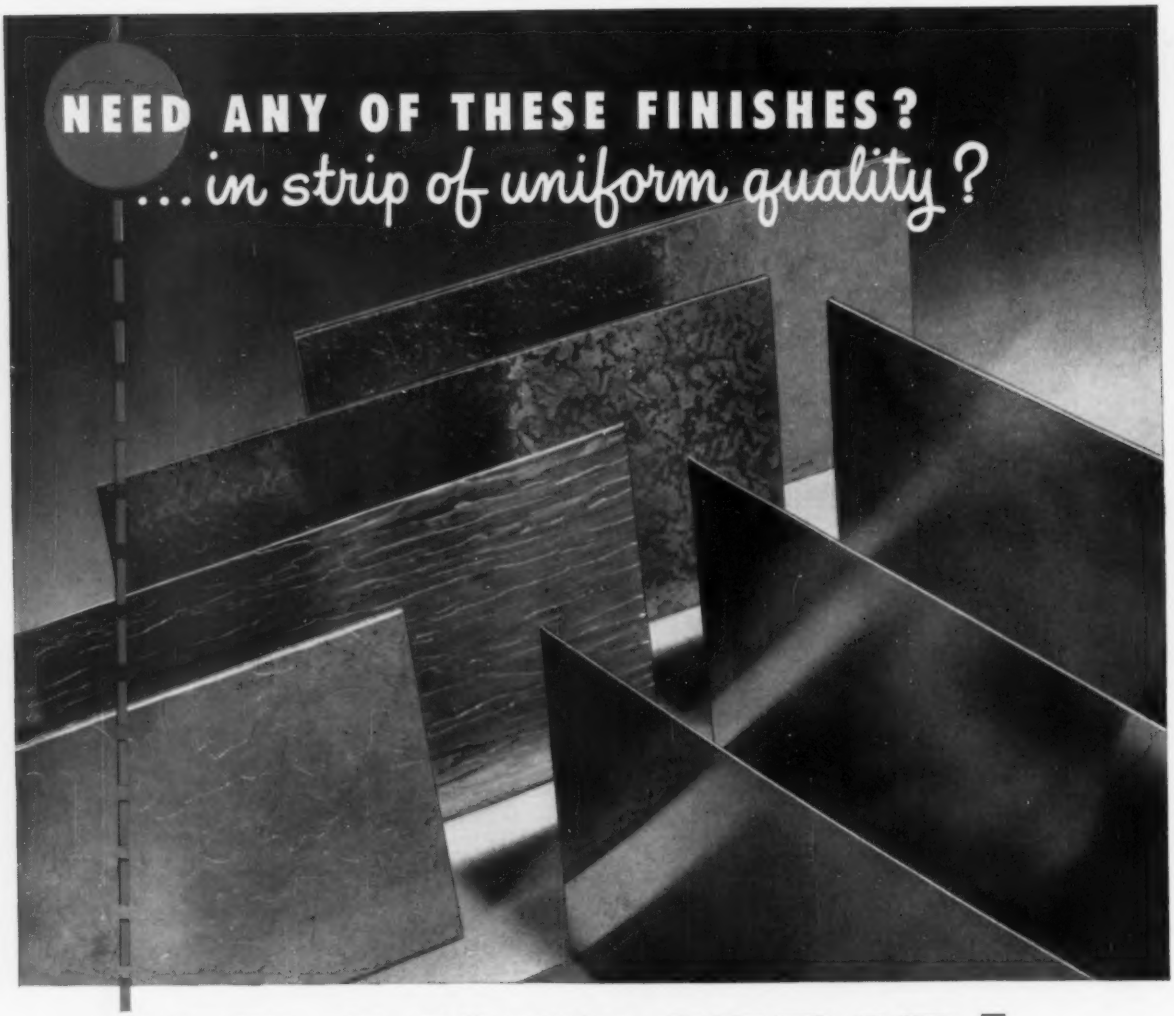
Like to speed up your reading?

Turn to pages 2 and 3 of The Iron Age every week and let the

Digest of the Week in Metalworking

help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!



GET AMERSTRIP!

Why buy Amerstrip? Simply this: it brings you a finish tailored to your needs. High quality Amerstrip will minimize reject problems and improve the finished product. These are the best reasons, but not the only ones, for choosing Amerstrip cold rolled strip steel.

The metallurgical care that goes into making the Amerstrip, the even temper that goes with every shipment, also help you cut rejects and costs, help you make steadily improved products of steel.

Amerstrip comes in the widest available range of analyses, sizes, and finishes. You can get it embossed, coated, or in any of the standard finishes.

Specify Amerstrip.

Amerstrip

USS

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

dates to remember

JANUARY

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Winter general meeting, Jan. 30-Feb. 3, Hotel Statler, New York. Society headquarters, 36 W. 46th Street, New York City.

EXPOSITIONS

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

FEBRUARY

NATIONAL INDUSTRIAL ELECTRIC HEATING CONFERENCE — Annual meeting, Feb. 6-10, Netherland Plaza Hotel, Cincinnati, O. Society headquarters, 420 Lexington Ave., New York.

PRIVATE TRUCK COUNCIL OF AMERICA, INC. — 17th annual convention, Feb. 9-10, Cleveland Hotel, Cleveland. Society headquarters, Sheraton Bldg., Washington 5, D. C.

AMERICAN SOCIETY OF CIVIL ENGINEERS—National winter convention, Feb. 13-17, Dallas, Tex. Society headquarters, 39 W. 39th St., N. Y.

AMERICAN MANAGEMENT ASSN.—Mid-winter personnel conference, Feb. 15-17, The Palmer House, Chicago. Society headquarters, 1515 Broadway, New York.

THE DROP FORGING ASSN.—Industry meeting, Feb. 16-17, Park Sheraton Hotel, New York. Society headquarters, 734 Union Commerce Bldg., Cleveland.

INSTITUTE OF SURPLUS DEALERS, INC.—11th annual trade show and convention, Feb. 19-21, 212th AAA Armory, N. Y. Society headquarters, 673 Broadway, N. Y.

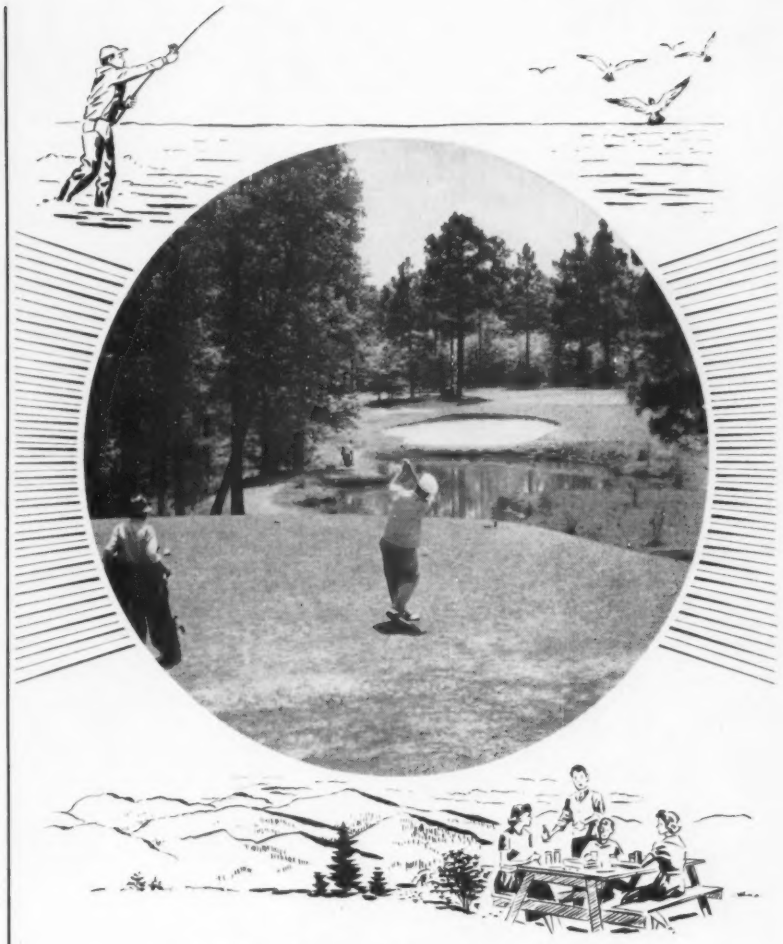
AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS—Annual meeting, Feb. 19-23, Hotels Statler and New Yorker, N. Y. Society headquarters, 155 E. 44th St., N. Y.

MARCH

NATIONAL ASSN. OF CORROSION ENGINEERS—National conference and exhibition, March 12-16, Hotel Statler, N. Y. Society headquarters, 155 E. 44th St., N. Y.

PRESSED METAL INSTITUTE—Annual spring technical meeting, March 14-16, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

STEEL FOUNDERS' SOCIETY OF AMERICA — Annual meeting, March 19-20, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.



PLEASANT LIVING is an industrial asset in North Carolina

The year 'round mild climate of Mid-South North Carolina, the "Variety Vacationland", is a benefit to industry in more ways than one.

Lower building and maintenance costs provide dollars and cents savings. Less tangible, but of even greater effect, is the value in employee stability and happiness. Workers are more contented, handle their jobs with more enthusiasm, because of the all-year recreational opportunities.

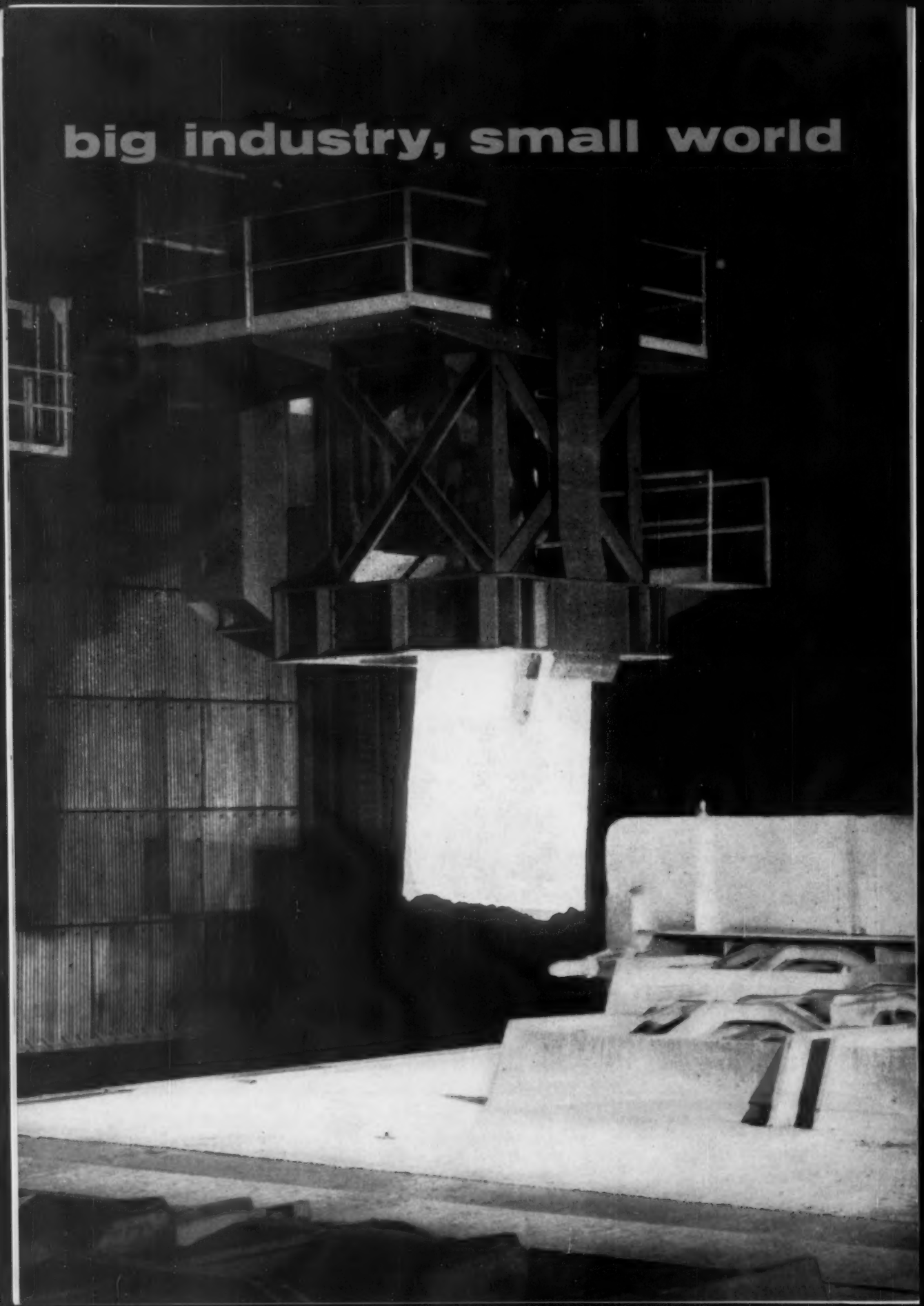
Key personnel find North Carolina to their liking, too. The scenic mountains, the famed golf courses, the long coast are all accessible here for family enjoyment.

Desirable industrial sites in this growing area are still available, both urban and rural locations. Complete information will be sent promptly on request by mail, telegram or phone to the Director, Dept. of Conservation and Development, Raleigh 11, North Carolina.

NORTH CAROLINA

YEAR 'ROUND MID-SOUTH

big industry, small world



annealing covers
billet reheating furnaces, continuous
carbon restoration and annealing furnaces, continuous
controlled atmosphere generators
high-speed stress relieving furnaces
one-way fired soaking pits
pit-type annealing furnaces
slab and billet heaters, continuous
strip annealing furnaces, continuous
strip galvanizing lines, continuous
wire patenting furnaces, continuous

Wherever this steel goes—from first soak to final shipping dock—it will find that the big steel industry is a small world as far as 'Surface' equipment is concerned. Somewhere along the line, whatever its destined shape, the steel will be made more workable and more useful in 'Surface' furnaces.

Why is it so easy to bump into 'Surface' in steel mills? One reason is that 'Surface' has literally grown up with the steel industry. A better reason is the confidence that steelmakers have in the performance of furnaces and generators manufactured by Surface Combustion Corp., Toledo 1, Ohio.

Surface
STEEL MILL FURNACES

Foreign associate companies:
British Furnaces, Ltd., Chesterfield; Stein & Atkinson, Ltd., London
Stein & Roubaix, Paris, Leige, and Genoa; Chugai Ro Kogyo Kaisha, Ltd., Osaka
Benno Schilde Maschinenbau, A.G., Bad Hersfeld (Hessen, Germany)

How to figure the economy of COPPER

You can evaluate copper, very simply...by looking forward.

Not backward, to yesterday. Not inward, on the problems of today. But *forward*, to tomorrow.

For the economy of using copper is *ultimate* economy. What substitute costs less than copper . . . or gives you better value . . . whenever you can figure cost *by the year?*

The copper roof on Philadelphia's Christ Church is 200 years old. The hardware in Mount Vernon has been used since Colonial days. Copper water lines have been found in Egypt dating from 3400 B. C. And brass pipes in Boston's Parker House were originally installed in 1854.

What will people say about *your* product years after they've bought it? If you use copper, they will say what men have said through the ages: "See . . . it pays to buy *quality!*"

When the reputation of your product is involved, make it with copper! Copper & Brass Research Association, 420 Lexington Avenue, New York 17, New York.

♀ COPPER & BRASS
RESEARCH ASSOCIATION

. . . AN INDUSTRY SOURCE OF TECHNOLOGICAL AID, INCLUDING A LIBRARY OF TECHNICAL LITERATURE AND A COUNCIL OF SPECIALISTS

COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES:

Best conductor of electricity commercially available

Does not rust . . . High corrosion resistance

Best heat transfer agent of all commercial metals

Easy to machine, form, draw, stamp, polish, plate, etc.

Welds readily . . . excellent for soldering and brazing

WELDCO TUBING USED BY FIRESTONE STEEL PRODUCTS CO. *to Fabricate Army Tank Mufflers*

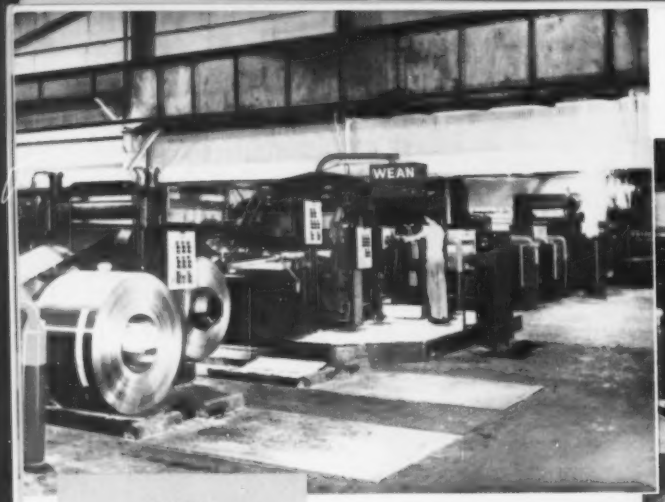
WELDCO Type 430-T Welded Stainless Steel Tubing was used in the tank muffler shown above. It was chosen for **ALL** the tubular parts because it met the heavy-duty requirements of this application. Firestone Steel Products Co., Akron, Ohio, specified WELDCO Tubing because of its exclusive Double-Fusion Weld and excellent fabricating qualities.

WELDCO Pipe and Tubing are available in Monel, Stainless Steel, Hastelloy, Inconel, Nickel, Cupro-Nickel, and Carbon Steel . . . in sizes 3" and larger, in Schedules 5 through 120. In addition, intermediate wall thicknesses and outside diameters can be produced to your specifications. For any special problems or regular applications, always specify WELDCO — Your Best Buy in Top Quality Tubing.

Whatever Your Needs In Tubing... You're 'Way Ahead With WELDCO

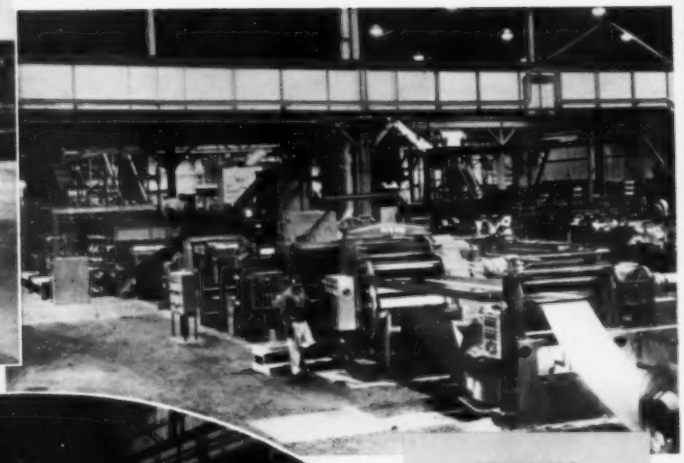
WELDCO

THE YOUNGSTOWN WELDING & ENGINEERING CO.
3718 OAKWOOD AVE. · · YOUNGSTOWN 9, OHIO



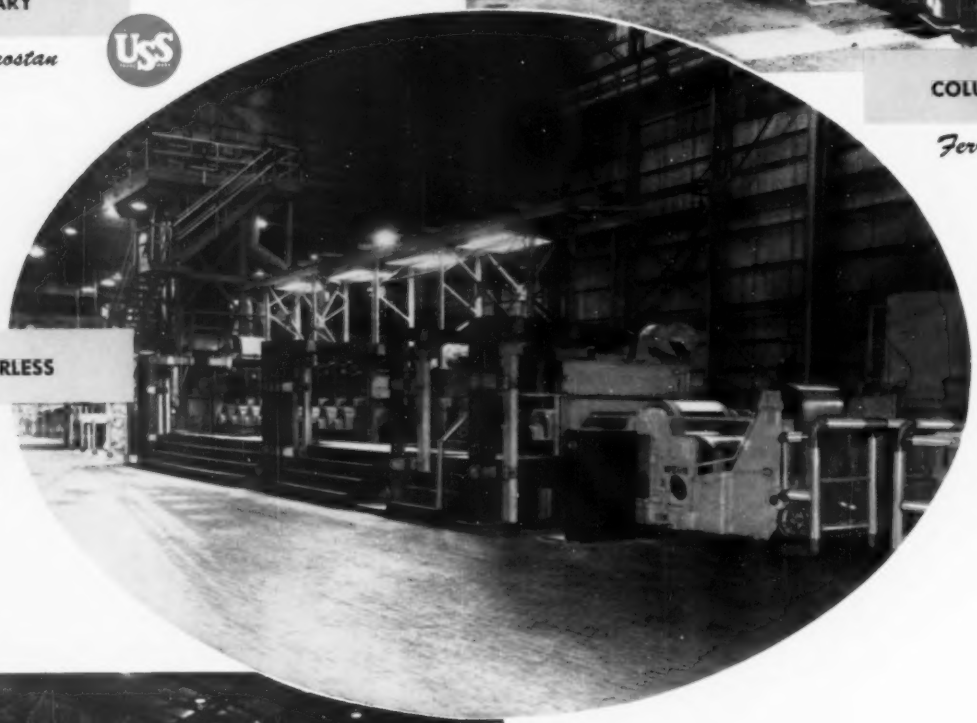
GARY

Ferrostan



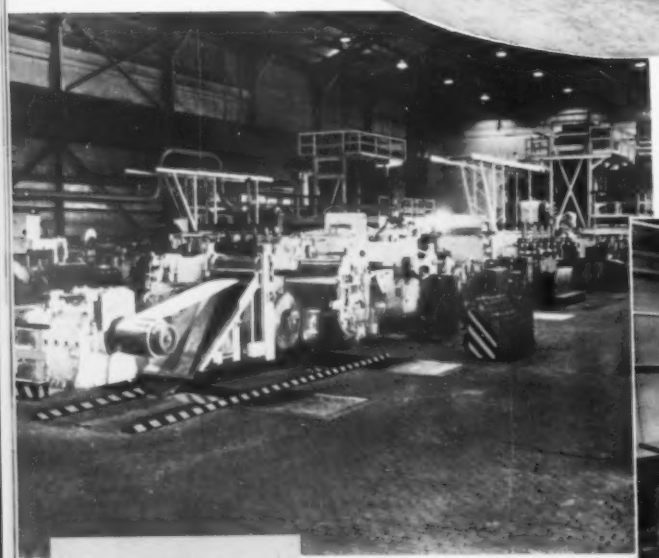
COLUMBIA

Ferrostan



FAIRLESS

Ferrostan

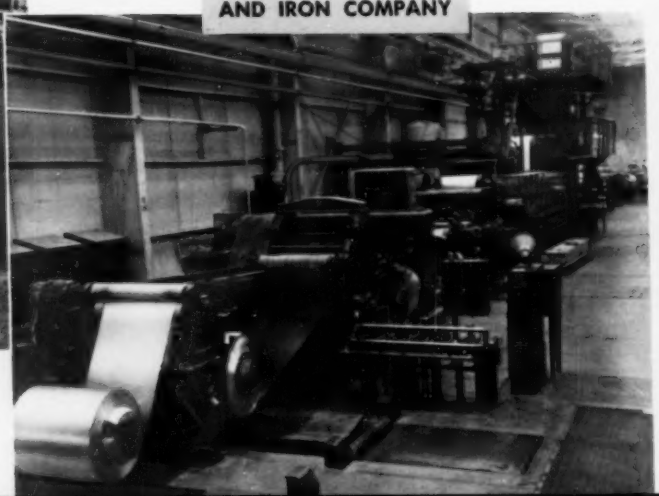


IRVIN

Ferrostan

Ferrostan

TENNESSEE COAL
AND IRON COMPANY



WEAN

. . . has designed and built 37 continuous electrolytic tinning lines . . . . . .

. . . In addition to the 37 continuous electrolytic tinning lines already designed, built and delivered by Wean to leading tinplate producers the world over — ~~four~~ five more are now in various stages of completion.

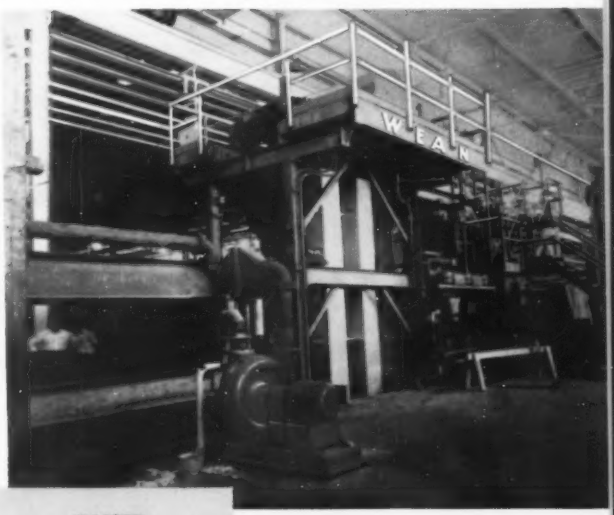
FORTY-TWO LINES IN ALL

(Ferrostan, Halogen, Alkaline)

Here's engineering experience and "know-how" beyond comparison. If your plans include TIN-PLATE facilities, confer first with the world's most experienced designer and builder.

WEAN
ENGINEERING COMPANY, INC.
Warren - - - - - - - - Ohio

WHEELING *Ferrostan*



KAISER *Ferrostan*

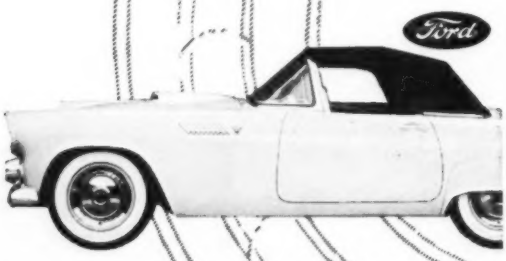
WEIRTON *Halogen*

JONES & LAUGHLIN *Halogen*

SPECIALISTS IN SHEET, STRIP AND TIN MILL EQUIPMENT

latest edition...

Extra! Few sights in the machine age are more dramatic than watching the latest edition of your daily paper roll off the presses. Few machines have to meet such split-second demands as newspaper conveyors. Federal lubri-sealed Ball Bearings help keep 'em rolling.



...or latest model

So much of a car's smooth, quiet running performance and safety depends on its ball bearings! And millions come off the automotive assembly lines, precision-equipped with Federal Ball Bearings.

so much of industry *turns* on FEDERAL ball bearings

Whether you're behind the headlines or headlights – or make hoists or harvesters . . . Whether you work in a machine shop or office – you'll find Federal Ball Bearings on the job. Hundreds of types – over 12,000 sizes – all produced by this 50-year-old company devoted *exclusively* to the manufacture of anti-friction ball bearings.

When Federal Ball Bearings are a part of so many things you *use*, shouldn't they be a part of the things you *make*?

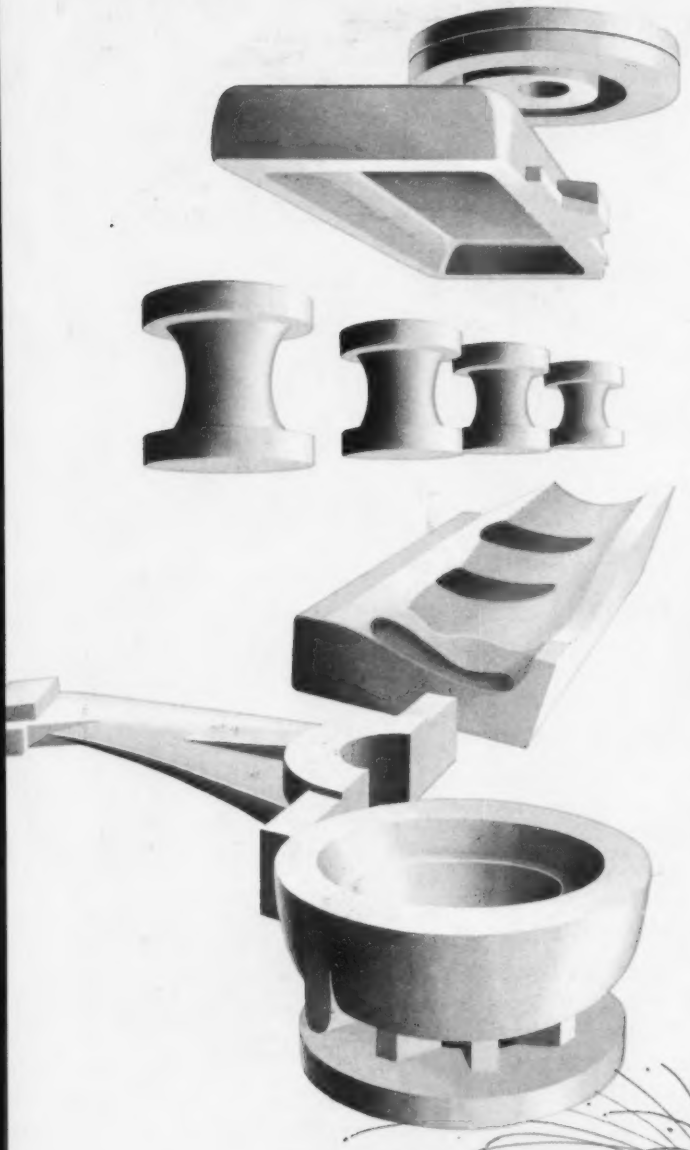
New! Ball bearing and engineering data! 175 pages full in FEDERAL'S NEW CATALOG! To get your copy, just drop us a line.

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

Federal Ball Bearings

One of America's Largest Ball Bearing Manufacturers

You save time and money with fine JESSOP cast-to-shape steels



If you employ the use of dies, forming tools, gauges, cams, rolls, or numerous other similar products, you'll find you save time and money by having these tool steel requirements cast-to-shape by *Jessop*. *Play us on your team*, and discover that the tool steel shapes we ship to you answer your most exacting physical and metallurgical needs and necessitate, at the most, a bare minimum of finishing. Also, you will come to know that doing business with the Cast-To-Shape Division of *progressive, fast-growing Jessop* is a pleasant, as well as profitable, experience. There are no *neophytes* or *complacent* steel men here. In the foundry, the laboratory, and the research department are highly-skilled men who take pride in their work. They get *good* customers and *keep* them by turning out sound, uniform, close-tolerance castings quickly. Become a *Jessop* customer, yourself, and find out.

STAINLESS STEELS • HIGH SPEED STEELS • NON-MAGNETIC STEELS • HIGH SPEED TOOL BITS • HEAT RESISTING STEELS • STAINLESS-CLAD PLATES CARBON AND ALLOY STEELS • TOOL STEELS FOR SPECIAL PURPOSES CAST-TO-SHAPE TOOL STEELS • HIGH SPEED AND ALLOY SAW STEELS TEMPERED AND GROUND STRIP STEEL • COMPOSITE HIGH SPEED STEELS STAINLESS AND HEAT RESISTING CASTINGS • COMPOSITE DIE STEEL SECTIONS • PRECISION GROUND FLAT STOCK DIE STEELS—HOT AND COLD WORK

JESSOP

STEEL COMPANY • WASHINGTON, PA.

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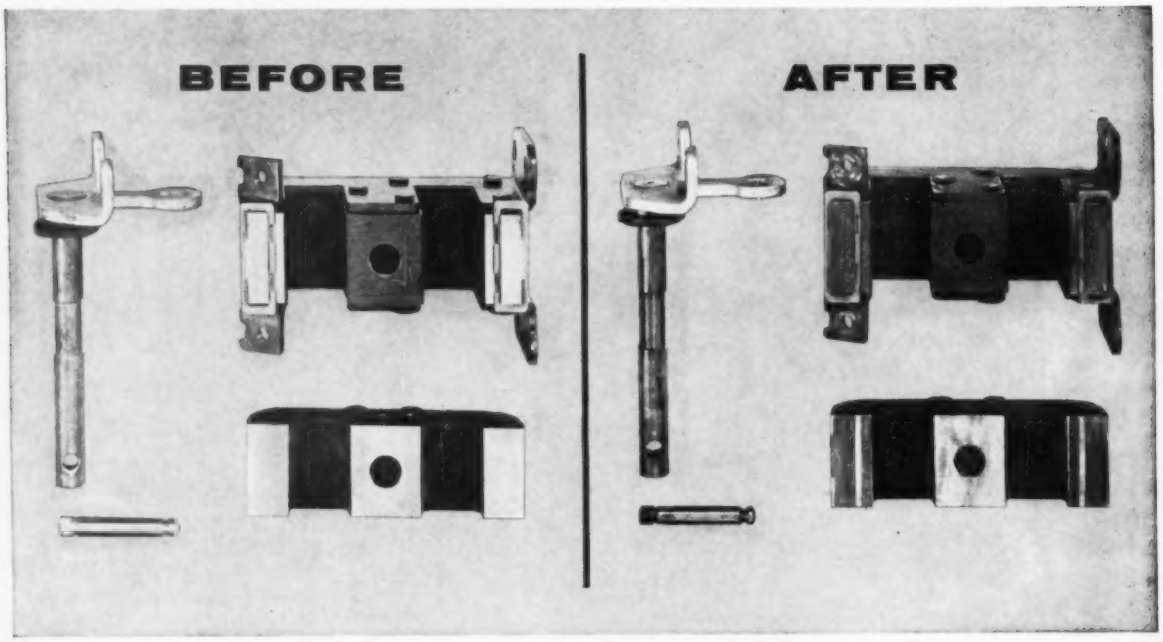
Jessop Steel of Canada Limited, Wallaceburg, Toronto

Jessop Steel International Corp., Chrysler Building, New York, New York



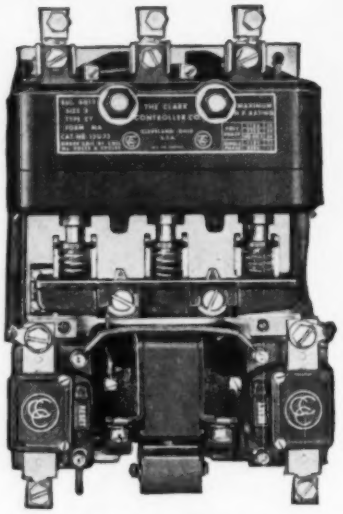
PROOF OF LONG LIFE OF CLARK TYPE "CY" STARTERS

These unretouched photos show magnet parts of a CLARK Bulletin 7707 Contactor—the contactor used on standard CLARK Bulletin 6013, Size 2, Type "CY" AC motor starters—as they looked before and after nearly 3 years of continuous service. During this time the contactor opened and closed 4 to 5 times per minute, 24 hours per day, 7 days per week—a total well over 5 million operations.

The contactor was in service at Taylor Instrument Companies, Rochester, N. Y., on a "Hevi-duty" molten salt pot electric furnace used for instrument calibration. It was installed *after several contactors of another make had failed in 4 months or less.* Our contactor was still performing perfectly when it was replaced by another identical unit, so that we could study the magnet wear.

All wearing surfaces were carefully "miked" and each dimension compared with the original. As seen in the "before and after" photos, wear was barely apparent to the naked eye. Micrometer readings showed actual wear measurable only in thousandths and ten thousandths of an inch. Only a fraction of the usable life had been consumed.

Write for descriptive literature.



CLARK Type "CY" Starters *include many more features for dependable service and reduced maintenance. Let us tell you the complete story.*

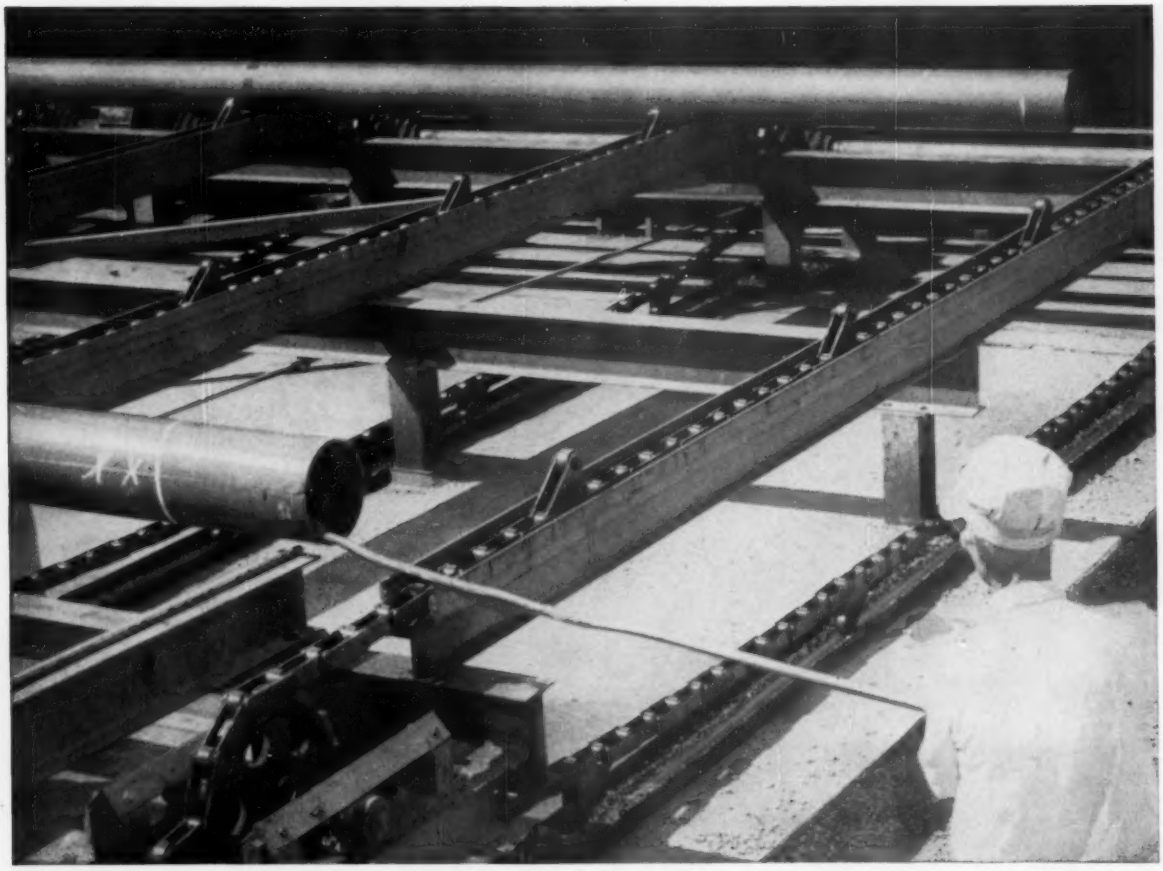
The **CLARK** **CONTROLLER** *Company*

Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

LXS is the chain for this job



Transfer conveyor from inspection to cut-off at steel pipe mill uses Link-Belt LXS chain with attachments to move the heavy pipe smoothly.

Heavy loads, impact, exposure— so LINK-BELT LXS is a natural choice at steel pipe mill

Handling 40-foot lengths of pipe that weigh around 1000 pounds each is a job that demands real stamina in chain. That's why the designers of this pipe mill specified Link-Belt LXS.

Use of selected steels plus accurate sizing and close fit of mating parts gives this chain ruggedness and accuracy. *It's the long-life answer for severe conveyor and drive service.*

And the story's the same for every drive and conveyor requirement — you'll find the chain that's *best* for the job in the complete Link-Belt line. No other single source can equal Link-Belt's broad range of roller and silent chain . . . of cast, combination, forged and fabricated types.

Your nearby Link-Belt office or authorized stock-carrying distributor can give you all the facts. Call today.

Close press fits, careful control of heat-treating processes plus other features, give LXS chain strength needed for heavy-duty applications

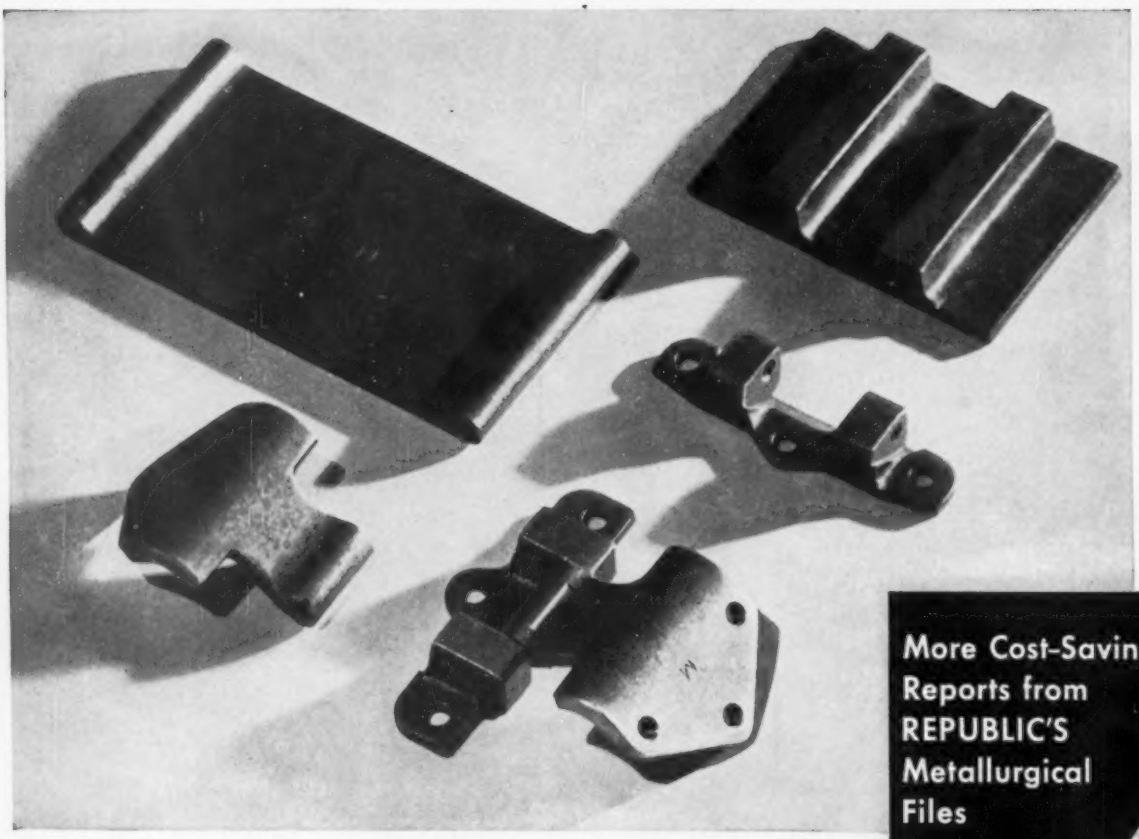
No ONE chain serves every purpose — get the RIGHT one from Link-Belt's *complete* line

LINK-BELT

CHAINS and SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

13,752



...the right metal in the right place

CUTS MACHINING COST FOR HINGE MANUFACTURER

These automobile door hinges are produced at less cost because much of the machining has been eliminated. They are made from Republic Hot Rolled Carbon Special Sections preformed to the predominating cross section of the component parts of the hinge. Parts are cold formed by broaching. Drilling and tapping are the only other machining operations necessary.

You can save money, too, when your steel parts can be made from Republic Special Sections. Large tonnage requirements are not necessary, but they do result in greater economies. We can produce cold drawn special sections in carbon, alloy, and stainless steels, in large or small quantities, to meet your requirements. Possibilities for variation in contour are almost limitless. Republic also supplies heavy tonnages of hot rolled sections in the same various steels.

Selection of the proper steels for each application requires many considerations—performance conditions, length of service, cost, processing methods, to name a few.

A Republic representative will be happy to call at your plant and discuss the possibilities of applying Republic Special Sections to your parts. He will tell you promptly and impartially whether the nature of your parts would make the use of special sections efficient and economical. There is no cost or obligation. Mail the coupon for prompt action.

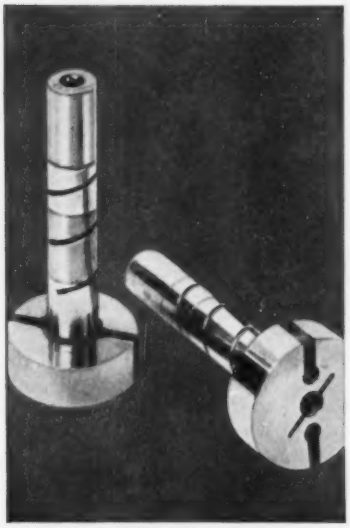
REPUBLIC

REPUBLIC STEEL

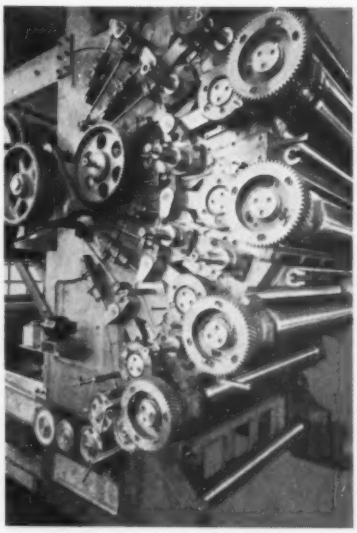
World's Widest Range of Standard Steels

Republic Alloy Metallurgists help refrigerator manufacturer cut scrap losses 25%

Here are the results of a switch to Republic Cold Drawn Alloy Steels in making this refrigerator compressor rotor—scrap losses cut from 25% to 0.1%, several high-cost finish-grindings eliminated, an every-piece hardness check reduced to a simple spot check, distortion trouble eliminated. Republic Metallurgists, Field, Laboratory and Mill worked closely with the manufacturer's engineers in selecting the right alloy steel with the required structure for proper hardenability, machinability and surface finish. What about your product or process? This 3-Dimensional Metallurgical Service is available to all alloy steel users without obligation. Check coupon if you would like a Republic Field Metallurgist to call.



Republic Pig Iron Metallurgist helps press manufacturer obtain superior finish and top machinability on cast parts



This company's requirements for cast parts are strict. They call for fine surface finish, wear-resistance, high strength and top machinability. To find a pig iron to meet these requirements a Republic Pig Iron Metallurgist was consulted. He recommended Chateaugay, Republic's exclusive premium pig iron. His recommendation was impartial because Republic is the only producer of all five grades of merchant pig iron. Chateaugay assures this company of fine grain structure throughout every casting. It cools evenly, fills adjoining light and heavy sections completely. Castings machine beautifully and economically. A Republic Pig Iron Metallurgist will be glad to show you how Chateaugay consistently outperforms other pig irons.

Republic Machining Specialist helps customer increase production 18%

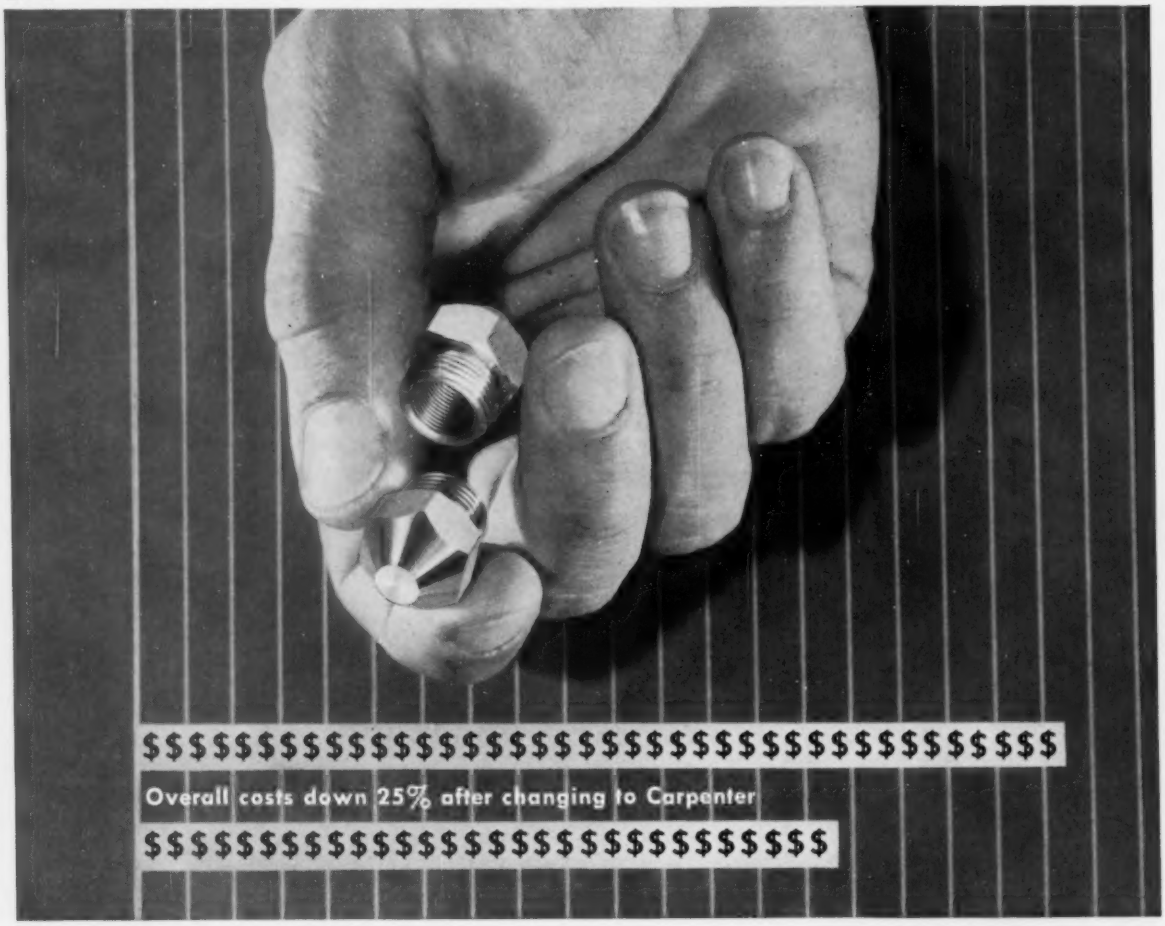
This automotive transmission parts manufacturer was having difficulty holding finish below 100 micro-inches. Part specifications called for a 40 to 60 micro-inch finish on a two-step internal bore, machined from Republic Cold Drawn B-1113 bar stock. A rush call went out for a Republic Machining Specialist. He looked over the job and designed a new broaching fixture and head to give a burnished finish under 10 micro-inches. The result: parts are superior to specifications; machine efficiency greatly increased; production up about 18%. What about you? Need help on machining or change-over problems? Republic Machining Specialists are ready with prompt solutions. Let us know when you would like one to call.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
3104 East 45th Street, Cleveland 27, Ohio
I would like more information on Republic Special Sections.
☐ Hot Rolled ☐ Cold Drawn ☐ Have a representative call
I am interested in the services of a Republic
☐ Alloy Metallurgist ☐ Pig Iron Metallurgist
☐ Machining Specialist
Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____
K-9621

Carpenter ... pioneers in specially-engineered steels through continuing research



HOW FAR CAN YOU GO

in holding down production costs of critical parts?

Fast, steady output and exceptionally fine finishes are essential in the production of these oil burner parts. With the steel first used, rejects were running too high, machine speeds had to be reduced . . . costs were excessive.

Here was a challenge. Was there a steel which would give equal or improved performance in the field, and machine easier and finish better in the shop? One of Carpenter's specially-engineered steels provided the answer. Now rejects are reduced 15% . . . finishes are vastly improved . . . and overall costs are down a healthy 25%.

How far can you go in improving both the fabrication and performance of critical parts you produce? We'd like to help you answer that question . . . help you raise your sights on the opportunities for improvement that exist with Carpenter-engineered specialty steels.

Start by sending for Carpenter's 32-page book, "Service on Specialty Steels." It gives you an inside look at how a *specialty* steel mill operates to serve you better. *The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.*

Are you taking advantage of these specially-engineered steels as made by Carpenter?

Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties

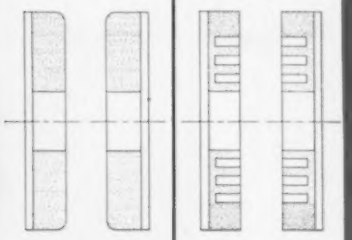
Carpenter STEEL

for product improvement

Disc life increased by 50%

Combination grade Gardner discs cut down time remove more metal per disc

Double disc grinding of small coil springs caused "bell-mouthing" of discs, low production, excessive dressing . . . . Gardner Abrasive Specialist recommended combination grade disc with smooth outer face of harder grade and deep corrugated inner surface of softer grade. The harder outside section resists wear, results in greater stock removal, longer life, fewer dressings.



Former Method single grade discs	Gardner Method combination grade discs
Disc Life 228 hrs.	Disc Life 340 hrs.
Dressings 187	Dressings 150
Stock Removed 852 lbs.	Stock Removed 982 lbs.

Softer grade with deep corrugations for rapid chip clearance

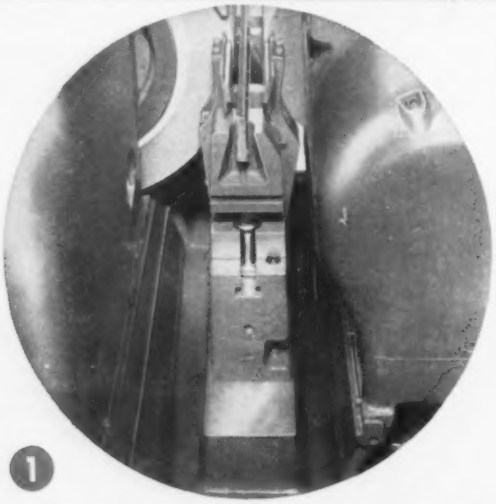
Harder Grade—Smooth section for shear cut and uniform wear

GARDNER

abrasive discs

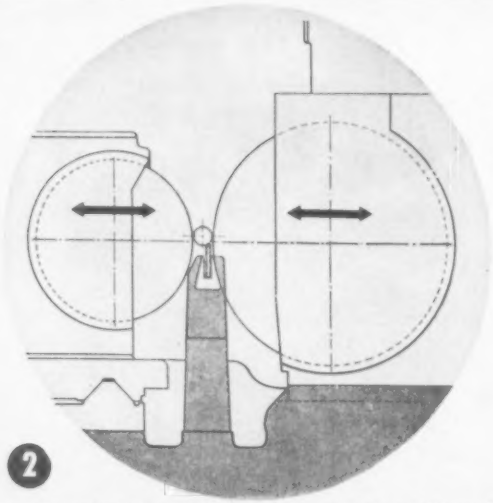
BELOIT, WISCONSIN

4 reasons why Landis centerless



1

"Rigid" work rest Solid support permits extra heavy cuts without loss of accuracy or finish.



2

Landis method of centerless grinding Work positioned on rigid work rest—Grinding and Regulating Wheel Heads slide on hand scraped ways.

3

Completely adjustable regulating wheel head

a. Tilt adjustment
b. Swivel adjustment
c. Wheel feed handwheel
d. Wheel aligning screw

4

***Both* grinding and regulating wheel spindles have Microsphere bearings** For fast spark-out . . . close tolerances . . . fine finishes

LANDIS

precision grinders

grinders lower production cost

No. 12 Centerless Grinder

LANDIS TOOL COMPANY / WAYNESBORO, PENNSYLVANIA

Strapping can be automatic

This husky Signode machine compresses and straps wire coils automatically. It ties them so tightly that more wire is stored in less space, and coils don't snag or tangle. Other automatic Signode machines bundle pipe and strap packages of many shapes and sizes. For high strength at low cost, you can't beat steel strapping to hold things together or in place. Signode has ways to make your products cost less to handle, store, ship and receive—ways suitable for even the smallest plant. Let a Signode representative show you. No obligation. Just write:

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Offices Coast to Coast. Foreign Subsidiaries and Distributors World-wide.
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HOW TO USE HALLOWELL ADJUSTABLE SHELVING

SELECT THE BASIC SHELVING UNIT

USE IT INDIVIDUALLY

OR IN COMBINATION

CLIP IN DIVIDERS

PUT IN SHELF BOXES

ADD SLOPING SHELF UNITS

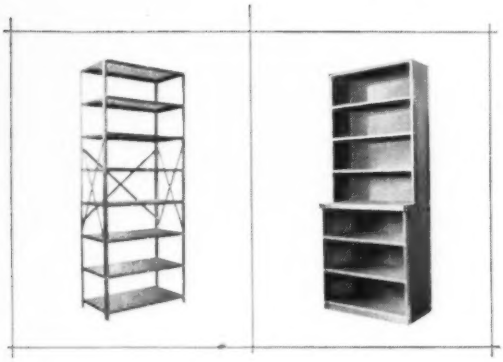
AND

BIN FRONTS

AS NEEDED

ATTACH SWINGING

OR SLIDING DOORS



Baked-on Enamel Finish • Sturdy Steel Construction • Interchangeable Parts Easy to Assemble • Stocked by Leading Shop Equipment Dealers • Send for Bulletin 2057 • Hallowell Shop Equipment Division • Standard Pressed Steel Co., Jenkintown 17, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

new Danly Presses doubled

FOR A LEADING

Individual Press Production Jumps From 100,000 to 230,000 Laminations Per Day

Not only did this leading motor manufacturer double lamination production by switching to new Danly Autofeed Presses, but the additional benefits of much longer die life and greatly reduced maintenance provided exceptional cost savings as well. With the installation of new Danly presses, carbide dies were made practical in this operation for the first time. Danly's extra-rugged, extra-precise construction assures these dies a life expectancy of nearly three years — 200,000,000 pieces.

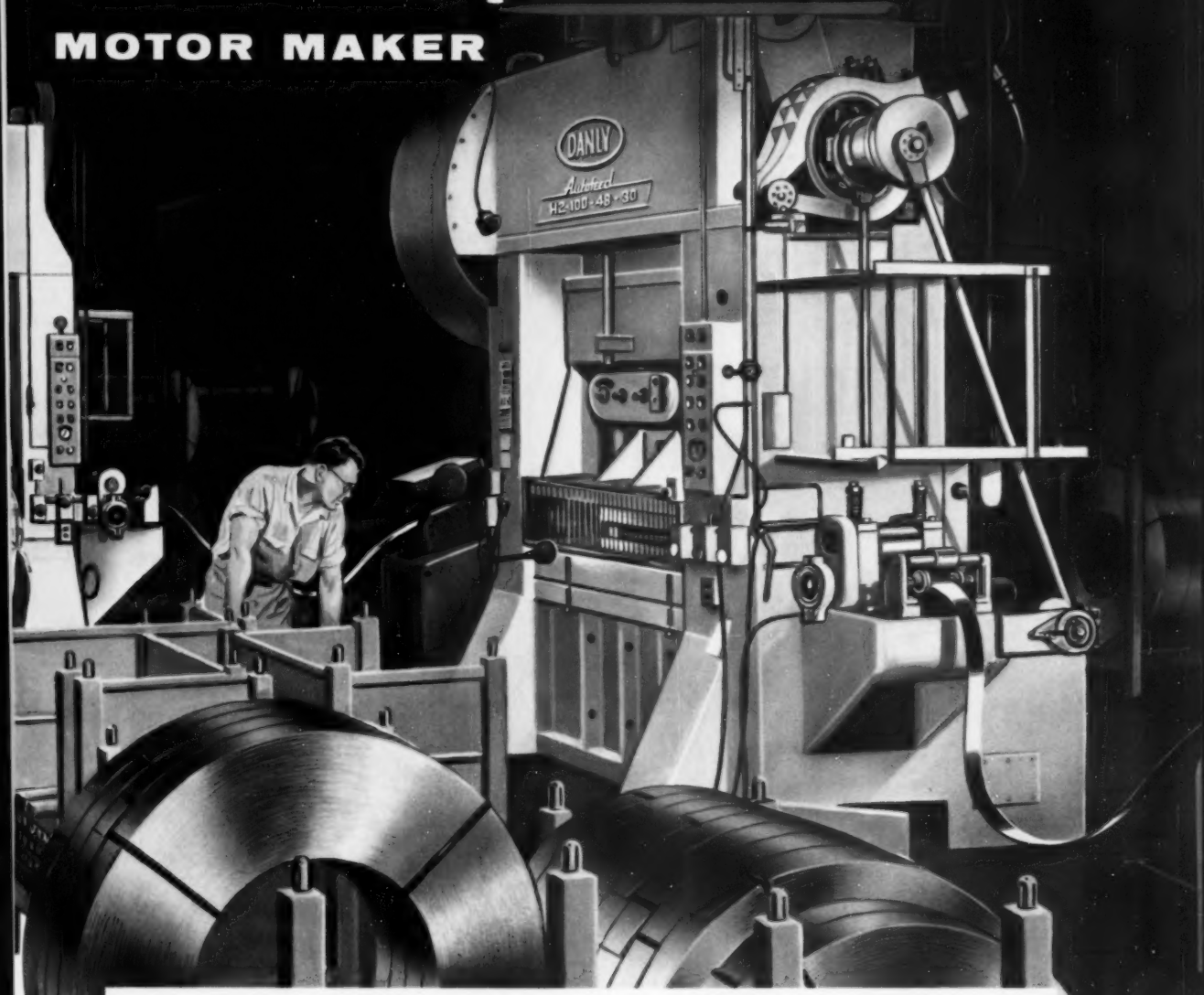
Maintenance records were set, too. Since installation, five Danly Presses have produced more than a quarter-billion lamina without downtime other than for die design changes and routine maintenance. Further, only 20% of the time formerly needed to keep dies in shape is now required. At the same time, each die is working harder, producing more than twice as many parts per day in the new Danly Autofeed Presses.

Find out *why* Danly Presses set such outstanding performance records . . . consult a Danly press engineer on *your* press requirements. Compare Danly Presses against all other presses yourself . . . check the important Danly features listed at the right. Discover why Danly Presses mean increased production at lower cost. Write for the complete new catalog on Danly Autofeed Presses today.

It costs less to run a DANLY PRESS

lamination production

MOTOR MAKER



Compare for yourself

BEFORE YOU INVEST . . . BE SURE YOU GET ALL THESE FEATURES

1. Machine tool precision in manufacture and assembly plus adequate lubrication assure smoother operation, longer life.
2. Danly presses are delivered "run-in" tested. Assembly and operation in the Danly plant means fewer adjustments, faster installation.
3. Danly's cool-running clutch lasts longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.
4. Extra-heavy construction reduces vibration and deflection. Dies last longer, presses stand up under severest duty.
5. Danly features completely automatic oil lubrication including slide gibs. Should any vital bearing not be sufficiently lubricated, safety switch stops press and indicates the source of trouble.
6. Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.
7. Controls designed and built by the press manufacturer assure the user of undivided, one-source responsibility for control and press performance on the production line.

DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Avenue, Chicago 50, Illinois

DANLY

THE STRONGEST WIRE MAKES THE STRONGEST ROPE... THAT'S WHY ONLY 1105 IS USED IN

ROEBLING

Royal Blue

WIRE 1105 ROPE

1105 WIRE is the strongest and toughest rope wire that has ever been developed.

Royal Blue is a new all-steel wire rope. It's made of 1105 wire—stands up in service—gives you more for your money because it has more to give.

Ask us for the full facts about Royal Blue Wire Rope, or contact your Roebling distributor.

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NEWSFRONT

Aluminum Bumpers A Possibility

Don't write off aluminum bumpers for passenger cars yet. Some very interesting possibilities have been suggested and are getting pretty serious consideration.

Titanium Pushes Cost Barrier

Sounds of a titanium break through the cost barrier are rumbling in the distance. High fabricating costs, one of the major deterrents to more extensive use of the material, should drop in the near future. Forming at elevated temperatures under closely controlled conditions is part of the answer. Crux of the problem has been traced to yield strength.

Now To Sell Congress On The Idea

Navy plans to ask Congress for money to build its first nuclear-powered aircraft carrier. Two years of observing the nuclear power plant on the submarine Nautilus has convinced ship designers that this type of power is now safe and practical for surface ships. Biggest advantage: It could steam for two years or more without refueling, stopping only for food and re-enlistment.

New Moly Carburizing Steels

A new series of carburizing steels with molybdenum as the chief alloying element is now a starred item with automakers. Designed especially for heavily loaded gears and other critical parts, these steels may be quenched directly from carburizing without excessive retained austenite. A low-carbon "core" helps ease the job of intricate machining.

Ore Fines Increase Yield

Blocked iron ore fines are helping one Ohio steel mill get greater yield from ore tonnage, at the same time improving openhearth performance through consistency of product. Finely screened ore, which would normally be blown out the top of a blast furnace, is mixed with mill scale and cement as a binder and compressed on a conventional block-making machine. Finished blocks are dried and used for openhearth charging.

Popularity Setting A Trend

Increasing popularity of the station wagon has prompted some automakers to reconsider their production plans for 1957. Oldsmobile is among the producers that will add a station wagon to its line next year.

Automation: Assembly Next On List

Builders of special machine tools look to automated assembly as their next big field. One spokesman, whose firm has already built machinery for automated assembly of an auto engine, predicts that this is only the beginning of things to come in the next five-year period. The television industry has started to redesign receiving set parts with automated assembly in mind. Other industries are following suit.

Titanium Gets A New Job

The unique physical properties of titanium have now been put to work in electronic tubes. The first such tubes use commercially-pure titanium for the anode, heater buttons, grid contact ring and cathode ring. Besides being light and compact, the tubes have many other advantages for uses in commercial, industrial and military equipment.

Tractor "Sniffs" Its Way Around

A new electronic tractor, guided only by an overhead wire, moves goods anywhere along a pre-established route. Radio waves emitted by the guide wire are picked up by a "sniffer" box on the tractor, causing the tractor to follow a desired course. No driver is needed. Any deviation from the prescribed path will stop the tractor automatically. If this happens, the tractor "yells" for help by blowing its horn or flashing a light.

Customer Comes First

Producers of fine-grained low and medium carbon steels are having a tough time showing a profit on these items. But rather than trigger an increase, they've resorted to heavy research to straighten out production problems.

ALLIS-CHALMERS FORK TRUCKS

Dumping material by the ton — one of many daily operations.

Tracks are crossed 30-40 times daily under load without truck damage.

Inventory simplified, storage increased with ton-at-a-time tiering.

Cut Handling Time 30% at Chicago Malleable Castings Co.

In two years, Chicago Malleable Castings Co., a leading mid-western foundry, has been able to reduce handling time 30% on all materials handled with an Allis-Chalmers FT60-24 Fork Lift Truck.

In specific instances, such as the boxcar unloading of refractory brick, the truck has reduced by 90% the handling time formerly required by conveyor system.

Equipped with a rotating device, the truck is also used for handling foundry sand and other bulk materials, and also for loading, transporting, and unloading such products as bonding clay, machinery, and rough castings. All these operations have been accomplished more efficiently and in less time than was possible with equipment formerly used.

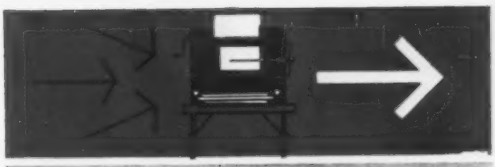
So impressive has been this performance record, that Chicago Malleable recently purchased another Allis-Chalmers truck for use in other areas of their modern plant. Used primarily for handling finished castings, including trailer-truck and boxcar loading, this truck handles 140 tons of materials in an average eight-hour day.

But utility is only part of the story. Maneuverability, ease of handling, low maintenance, and dependable, long-lived operation — even under adverse foundry operating conditions — are all features combined in every Allis-Chalmers Fork Lift Truck. It's the winning combination for progressive foundries throughout the country.

BUDA DIVISION • HARVEY, ILLINOIS

Write today for your free copy of our 36-page, fact-filled booklet which explains in detail the many exclusive features that make Allis-Chalmers Fork Lift Trucks the choice of industry everywhere.

ALLIS-CHALMERS



NEWS SECTION

Piggy-backing Spawns A New Industry

Evolution of railroad piggy-backing opens up new field based on specialized equipment . . . Mobilvan containers get first test . . . Growth spurred by problems of handling truck-trailers—By *K. W. Bennett.*

◆ PIGGY-BACKING on the railroads has spawned a new industry based on specialized handling, shipping, and hauling equipment.

Builders have converted one large trucking firm, Spector Freight System, Inc., to the new approach. The company has ordered 32 Mobilvan units designed specifically to ride atop a railroad flatcar or a flatbed truck. Six of them are in use.

Clark Equipment Co., designer of the Mobilvan, builds special fork trucks and straddle trucks to lift the units from flatcars and place them on waiting truck chassis or in storage areas. White Motor Co. has designed a truck tractor and chassis to carry the loaded Mobilvan cargo containers. Fruehauf builds Mobilvans under a Clark license.

About 33 railroads already are piggy-backing truck trailers on railroad flatcars. And while no more than 15 flatcars are equipped to handle the Mobilvan shipping containers, builders see prospects of some 500 cars being adapted to the new system in 1956.

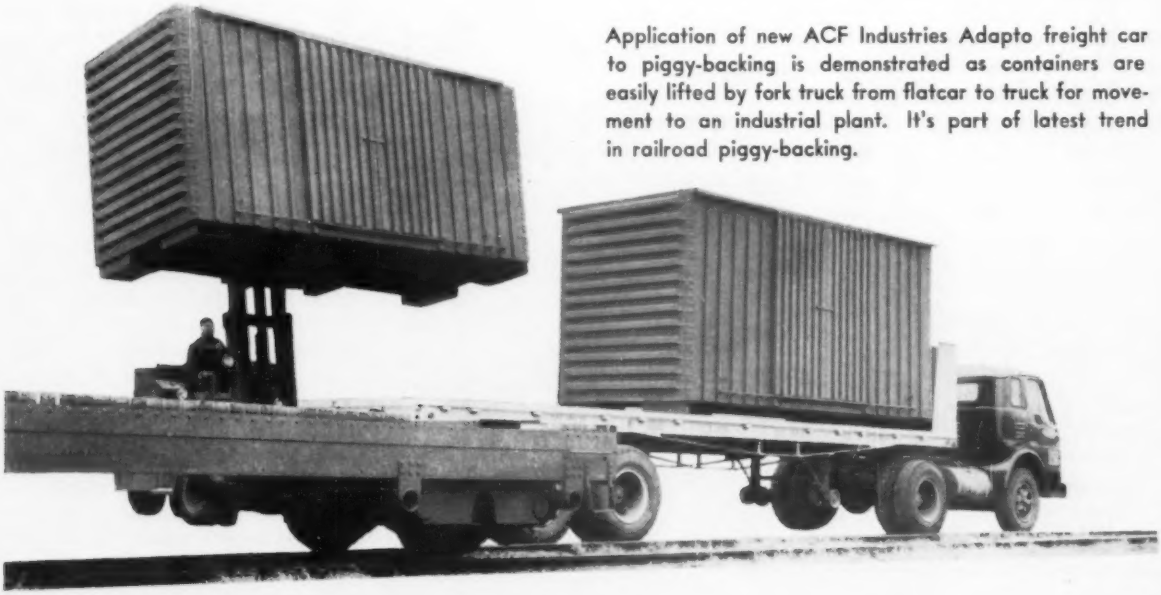
How It Works

Working in favor of the specialized equipment people is the trouble railroads are running into in getting loaded trailers on and off flatcars. One road reports that clutch failures in tractors used to move trailers on and off the cars have tripled. Others report a three-times higher blowout rate in trailer tires where handling scuffs the tire sidewalls. Weight of the loaded trailer on trailer wheel bearings under the unusual stresses encountered is causing damage to the bearings. Time needed to get a loaded trailer atop a flatcar is long.

The Mobilvan rides directly on the flatcar without the additional weight of the trailer chassis and tires. The lockdown device is simple to install on most flatcars. Loading time is reduced as the containers are lifted directly to a waiting truck by special fork truck or a straddle truck.

ACF's Adapto Car

Container-on-flatcar is out after the TOFCee (trailer-on-flatcar) market, and the bets are that within three to five years it will have equalled or surpassed the volume of trailer-on-flatcar traffic. At least four railroads have bought cars equipped with a Mo-



Application of new ACF Industries Adapto freight car to piggy-backing is demonstrated as containers are easily lifted by fork truck from flatcar to truck for movement to an industrial plant. It's part of latest trend in railroad piggy-backing.

bilvan, or container, lockdown. Others are nibbling.

Like a Chameleon

ACF Industries' new Adapto car was designed with a weather eye on the Mobilvan, and the Adapto is regarded by railroaders as another "hot" item.

The Adapto is described as an "all-in-one" basic car weighing and costing about one-half standard type freight cars with comparable equipment. Piggy-back features include box containers to facilitate transportation from shippers' door to receivers' door. The containers can be lifted off the flatcars and onto waiting trailer-trucks by crane or fork lift truck.

ACF says the "all-in-one" design of the Adapto lends itself to box, container-hopper, gondola, tank car, hopper car, and caboose as well as to piggy-back service. This is achieved by the interchange of removable superstructures on the car's platform, which has automatic leveling valves to keep the platform loading height constant, regardless of load.

First railroad to buy the new Adapto cars is the Rock Island, which placed an order for 50 basic cars, with box compartments, for delivery around mid-year. ACF plans to mass-produce future orders for the Adapto.

ONE OF nation's largest trucking lines has put Mobilvan equipment into service in first commercial test of new twist in piggy-backing.

Railroad-Truck Team

ACF and Fruehauf have teamed up on a "package" deal whereby shippers and carriers can acquire the basic equipment for piggy-back operation in one transaction. It's the first such product sales-tie-up between a manufacturer of equipment for the railroads and a manufacturer of equipment for the trucking industry.

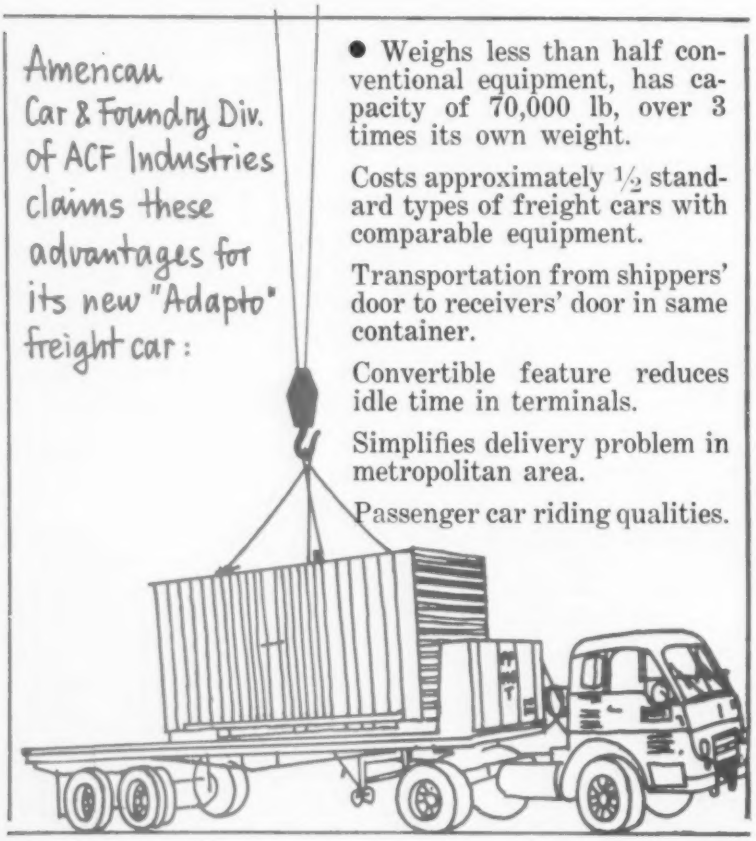
The companies have also set up a joint engineering and sales force to assist the transportation industry in piggy-back problems. The combination will be flexible as to the number of truck trailers that will be offered with each Adapto car.

Invading Overseas Field

Although Rail-Trailer is the name commonly heard in connection with terminal facilities for handling Mobilvan containers, Cortran, Inc., in the East, has already tested Mobilvan containers in overseas shipment, is working up a special container for shipboard use. It is also preparing to use standard Mobilvan equipment along the route of an eastern railroad.

Railroad people are watching these latest developments closely as another step toward recapturing some of the business lost to trucks in recent years. The truck-rail combine may be the answer.

New Look In Piggy-backing


American Car & Foundry Div. of ACF Industries claims these advantages for its new "Adapto" freight car:
• Weighs less than half conventional equipment, has capacity of 70,000 lb, over 3 times its own weight.
Costs approximately ½ standard types of freight cars with comparable equipment.
Transportation from shippers' door to receivers' door in same container.
Convertible feature reduces idle time in terminals.
Simplifies delivery problem in metropolitan area.
Passenger car riding qualities.

WAREHOUSES: To Move Or Not To Move

Chicago steel warehouse moves to suburbs to get away from congested areas . . . But few others will follow trend while inventories are low . . . Last year's business will set new record . . . Outlook is still the best.

◆ STEEL WAREHOUSEMEN, despite one of their best years under their respective belts, are going slow on expansion plans.

Those that are moving to bigger quarters have the choice of knocking out the walls of their present plants, often in congested areas, or moving to the wider open spaces.

A. M. Castle, rated the nation's third largest warehouse, touched off the industry's 1956 expansion plans with the announcement of a $4.5 million outlay in 1956. The new plant on Chicago's far west side will have 392,262 sq ft under roof, increases Castle's Chicago floor area by 50 pct.

Congestion Hurts

Castle's reasons for an expansion in a year when much of the industry is resting on oars are threefold. The firm was feeling cramped for space on its old location, a site occupied since 1912. Traffic congestion was an increasing problem and the new location puts the firm out of the congested area and near a projected toll road site. The additional floor space will provide room for expansion with Chicago's growing metalworking industry.

Though Castle moved to the country, it appears there will be little general expansion from the city to the country, in Chicago at least, for most warehouses. Where the move to the outlying areas occurs, it will probably be justified by the three problems faced by Castle.

Despite the considerable discussion involving moving to edge-of-city sites of warehousing facilities, expansion footage figures would indicate that warehousemen have done more of their expanding at in-city sites. For instance, a major firm that expanded its warehouse facilities at city outskirts by 160,000 sq ft over a four-year period, put 372,000 sq ft under roof in midtown sites in two different metropolitan areas in the same four years. With large warehouses already located at in-city sites, the tendency has been to expand these where traffic conditions, tax rate, available labor supply, and room for expansion have permitted.

Indications are that the industry won't meet its average of 1 million sq ft of expansion this year. Guesses are that warehousemen will add between 750,000 and 800,000 sq ft.

This figure is slightly lower than in 1951, a year in which construction was curtailed by steel shortages. In 1949, the industry had an estimated 25 million sq ft of plant space. At the end of 1955, the total was about 31,800,000 sq ft.

Costs Are High

Probable reason for slowdown in warehouse expansion is the old argument of whether to spread out the inventory or pile it higher. Most managers feel they could use more inventory, and 1956 will see an increase in the "model inventory" tonnage. But at the current high cost of expansion, warehousemen feel that the racks must go higher inside the plant before the walls move outward.

The construction slowdown hasn't been due to lack of warehouse business. It is general opinion that when the smoke clears away, general line and specialty steel warehouses will have shipped a record 15 million tons during 1955 and that half of this tonnage came from general line.

Another All Basic Furnace

◆ THE THIRD all basic open-hearth furnace in the Chicago District was being readied for action last week as Inland Steel workmen put the finishing touches on a new flat roof all basic in the No. 2 open-hearth shop.

Both U. S. Steel (South Works) and Keystone Steel & Wire Co., Peoria, have been operating all basic furnaces in the district. U. S. Steel furnace No. 10 is opening its ninth year of production. Keystone has tested its flat roofed all basic through two campaigns with increasingly favorable results. U. S. Steel last year reported 5 pct fuel savings in operating No. 10 furnace despite the higher operating temperatures and faster steelmaking pace at which all basic furnace development is aimed.

Inland's announced intention in beginning experiments is to reduce furnace downtime for repairs. All basic brick holds up longer than conventional silica roof brick.

The worn out roofs must be rebuilt after about 130 heats, and Inland hopes to achieve 300 heat roof life with an all basic roof—that is, 300 heats before major repairs, 400 heats before complete roof replacement becomes necessary. A furnace rebuild job may mean pulling the furnace out of action for 48 to 60 hours.

MANAGEMENT

STOREKEEPING: Time for a New Look

Handling of stores is a frequently neglected management function . . . New requirements make stores a complex problem, but also a place to cut indirect costs . . . Book tells how.

◆ IT'S NO SECRET to management that indirect costs can make the difference between profit and loss on any manufacturing operation.

But finding these areas of unnecessary cost and inefficiency is a different matter—one that is getting more and more management attention. One of the most fruitful areas for cutting indirect costs and increasing production efficiency is in the handling of stores.

Stores operations generally lag behind materials handling and even maintenance in management attention. This is in spite of the fact that until recently one third of the nation's manufacturing labor payroll was paid out for handling expenses, and 80 pct of this work was done manually.

But storekeeping (often called storeskeeping or any one of several terms) is now becoming an important management function. The methods in which materials of production are received, recorded, and distributed to manufacturing are under close scrutiny, resulting in important economies and gains in efficiency.

Book Tells How

How stores department costs can be slashed, efficiency increased, and many other important tips on stores handling are contained in a new book, "Industrial Storeskeeping Manual" by Benjamin Melnitsky, published by Chilton Co.

There is no single blueprint for increasing storekeeping efficiency for all plants. The function varies widely with size of the plant, type of product, speed and volume of manufacturing and assembly, and a host of other factors.

Improve Your Industrial Storekeeping

● Reduce and simplify stock by standardization. — Coordinate name and number designations of parts in stock. — Keep clear and accurate records and stock entries. — Locate storage and stock rooms to best possible advantage. — Be sure layout of store rooms is efficient. — Plan receiving, stowage and issuance of stores. — Make sure stores are protected from damage or theft. — Keep up to date on obsolescence and scrap policies. — Coordinate storekeeping with other management functions.

But many of the reasons for increased efficiency in stores handling have universal importance. For one thing, the increasing cost of construction makes efficient use of every square foot of floor space of vital importance. At the same time, the complexity of materials and parts is growing steadily, multiplying the number of individual items needed for a manufacturing job.

In a prewar manufacturing plant of medium size, you could get by with three or four grades of steel, a few nonferrous alloys and some grades of cast iron. Today the same plant may stock 10 grades of stainless steel, 50 grades of carbon steel, and a long list of alloy materials of all kinds.

Consolidate Functions

To get increased efficiency, the Aluminum Co. of America has lumped all of the functions of inventory control, stores accounting, receiving, procurement, transfer, and disposal of surplus into a single organization, the stores division of the accounting department.

Coordinate Departments

In addition to the strict application of storekeeping, there are other ways to cut your stores operation costs. Purchasing can schedule deliveries so materials arrive at times they can be handled most conveniently.

Obsolescence is another problem connected with stores. Obviously, quantities of certain parts or materials should not be ordered or stored when they will not be used. Frequent styling changes in most consumer goods make this a point to be watched closely.

Close tolerances to which most manufacturers work also demand a high degree of stores precision. Items with fine dimensional requirements, such as pistons or other moving parts, can not be subjected to careless stores methods.

AUTO DEALERS: Are New Laws Necessary?

Survey shows dealers want laws against phantom freight and bootlegging . . . Entire present system of car marketing is threatened by mass sales, some say . . . Discounting prevalent—By *R. M. Stroupe.*

◆ DETAILED DIGGING into the mechanics of moving new cars from factories to ultimate users is getting fresh impetus on Capitol Hill.

Backed by a recent survey of franchised new car dealers, a Senate Commerce subcommittee will hear intermittently in the next two months a number of industry statements on problems involved in auto marketing. Testimony will be gathered on phantom freight charges, auto bootlegging, factory-dealer relationships, and financing of car sales.

First witness before the subcommittee in mid-January was President George Romney of American Motors Corp., whose company has opened a new program to give dealers greater voice in such matters as franchise terms. He was followed by Frederick G. Bell, executive vice president of the National Automobile Dealers Assn., who testified on dealer contracts.

Work on Bill

Significantly, Sen. Monroney, D., Okla., chairman of the Senate group, says there is now no "effective" bill on factory-dealer relations pending in the Senate. Upshot of the hearings may be the introduction of a bill that would place the dealer in a stronger position to bargain with the manufacturer.

Sen. Monroney contends that results of the survey of franchised dealers, nearly 20,000 of whom replied to a questionnaire on marketing practices, show that not all retailers are willing to continue in business under present terms. A number, he asserts, have told him they intend to drop their franchises and operate auto "supermarkets," getting their stocks directly from assembly plants or from excess stocks of other dealers.

Profits Low

These sellers allege that excessive production of the autos they now handle, factory pressure to accept more cars than can profitably be sold, and operations of unethical franchised dealers are forcing them to operate at little profit.

About 71 pct of those replying to the questionnaire, or 13,581 dealers, said the primary cause of car bootlegging practices is factory overproduction. Bootlegging, or discount selling to nonfranchised dealers for resale, seriously harms the legitimate dealer, according to 11,552 retailers. More than 16,000 said discount selling was at least as prevalent in 1955 as in 1954.

Need for congressional study or new laws concerning car retailing was seen by 13,749 dealers. A larger number, 14,185, favored laws permitting car builders to cancel franchises of dealers who dispose of their cars for resale by bootleggers.

Freight Problems

About three out of four dealers told the subcommittee they wanted charging of excessive freight fees for delivery of new cars, or phantom freight, eliminated. At the same time, 11,042 persons stated they did not know if the freight charges they now pay are more or less than actual costs.

Dealers were well split on the question of territorial security, a former practice whereby each franchised dealer was given a certain market area for his car. More than 8,000 like the idea, but better than 7,000 reject it.

The relationship between auto dealers and manufacturers was before Congress in the last session. At that time the industry strongly defended its practices and dealer relationships.

Since then, however, there has been some evidence that the industry is putting less pressure on its dealers, which may be responsible for some of the slack in sales of 1956 model cars.

What Car Dealers Want from Congress

Should Congress ban phantom freight?

YES **14,891**
NO **984**

Is bootlegging hurting your sales?

YES **11,552**
NO **6,463**

Should Congress allow manufacturers to cancel franchises of dealers who sell to bootleggers?

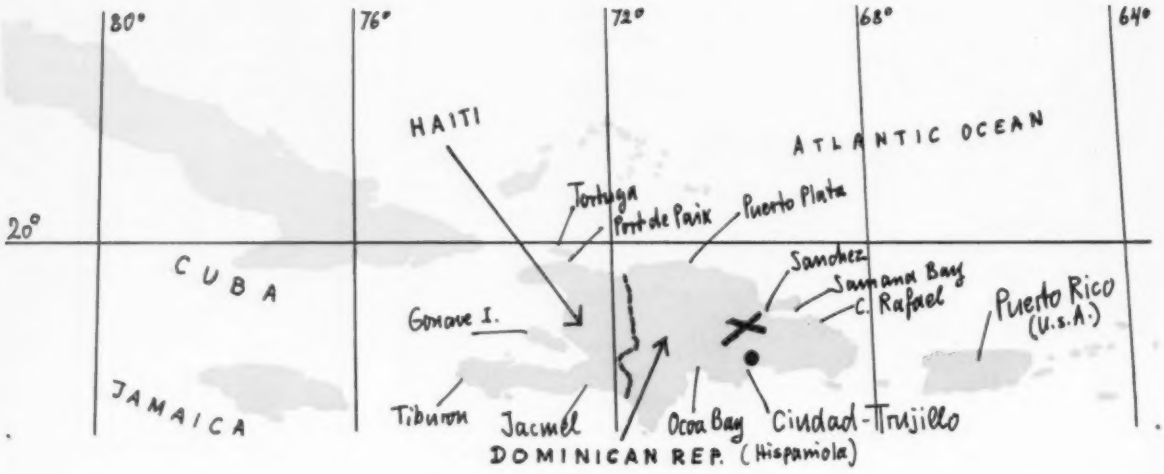
YES **14,185**
NO **3,411**

Do you favor congressional study or legislation dealing with auto marketing problems generally?

YES **13,749**
NO **1,991**

LUMP ORE: A "Gold" Mine Pans Out

World-wide quest for iron ore to feed U. S. furnaces goes on with little fanfare . . . Rapid rate of steel expansion dictates continuing search . . . Barium speeds expansion of lump ore project—By Tom Campbell.



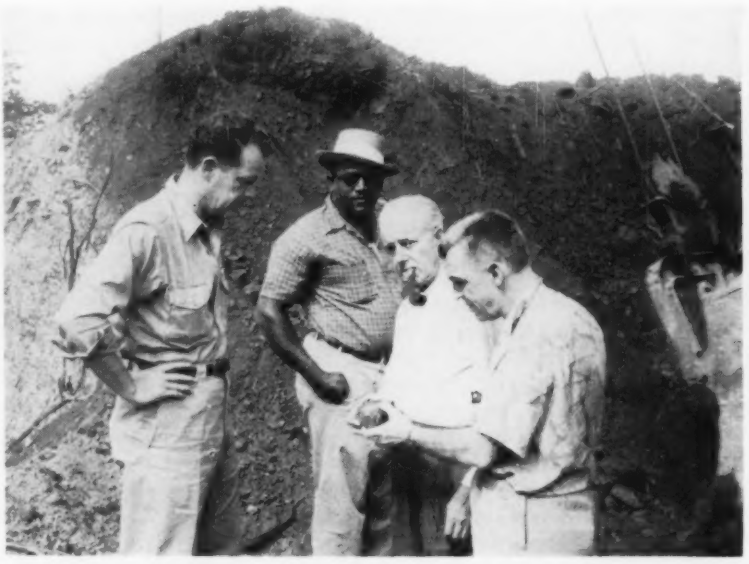
◆ ANOTHER BIG hunt is on—quietly. The substantial—and to some—unexpected increase in steel production in recent years is causing a serious reappraisal of the iron ore situation. And well it might.

There is little chance that blast furnace ore will be as tight as it seemed back in 1948. But there is not the same confidence and assurance of future supplies as there was immediately after the ore developments in Canada and in Venezuela got underway.

The success of the taconite program and the expansion in mining in Quebec-Labrador and in Venezuela will assure us that we will not be in serious straits in case of an emergency. But the vast increase in capacity estimated many weeks ago by THE IRON AGE at 16 to 17 million tons in four or five years, suggests the need for continual ore prospecting—here and abroad.

But there is one kind of iron ore that is fast becoming "gold" to steel makers—lump ore. There are a few companies fortunate enough to have—for the present—fair supplies of this high iron content lump ore. Many steel companies are dependent on a "catch as catch can" basis for their supplies.

Two of the larger steel firms have holdings in Africa. One case



Tom Campbell (right) with J. A. Sisto, Barium's chairman; H. Freeman, vice president, Phoenix Iron & Steel, and mine boss Richard.

involves a big operation in which the company and the government are getting along like brothers. In the other instance there is at present an argument over projected railroad routes. But that is expected to be settled soon.

Lump ore is used extensievly in the production of steel to bring down the carbon content of the bath before the heat of steel is tapped. It is charged directly into the furnace where the big lumps expose enough iron oxide surface to promote a quick and proper reaction necessary to reduce the carbon in the bath.

The search for lump iron ore usually takes our people to foreign lands. Barium Steel Corp. (with its steelmaking subsidiary, Phoenix Iron & Steel Co.) has been carrying on a limited rich ore operation in the Dominican Republic and now is expanding its mining operations.

READY! This lump ore on the docks at Ciudad Trujillo, Dominican Republic, will wind up in United States furnaces.

Expansion Plans

The Compania Dominicana De Minerales is Barium's ore subsidiary. At present about 9,000 to 10,000 tons of high Fe content ore are being moved to the United States from the Port of Ciudad Trujillo. Barium uses the fines and some of the ore not classed as lump for its own blast furnace at Chester, Pa. It sells the lump and other ore in the United States on a contractual basis.

Present mining is being done in a 13-mile area about 65 miles into the interior from Ciudad Trujillo. The developments are sporadic with outcroppings and residual ore bodies. The location generally is referred to as the Hatillo area and is in the province of Sanchez Ramirez. The ore has been known to exist on the Dominican island since 1917, at least, but big tonnages—for the island—were first brought out by Barium.

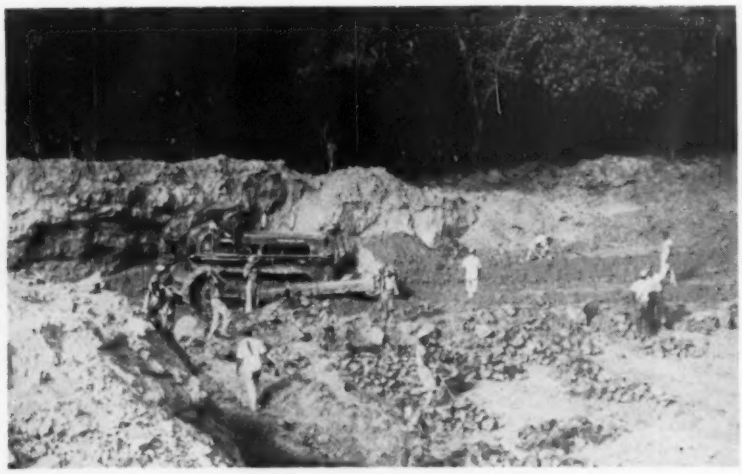
The relationship between Barium's Boardchairman J. A. Sisto and Dominican Government officials is such that a large scale expansion program is now underway; and nearly completed. Mining operations—mostly for lump ore—are slated to reach a target of 35,000 tons a month this year.

It is no exaggeration to say that this Dominican ore is fabulous. It runs between 66 and 69 percent Fe with a substantial tonnage of the ore running to the latter figure. Full-scale and extensive drilling to determine actual reserves has not yet been carried out but it is safe to say that the tonnage of 66 to 69 percent Fe ore runs well into the millions.

It's Not Easy

Getting the ore out is no child's play. At present the trucks moving the ore must travel a winding narrow road a distance of 65 miles from mine to the port. Within a distance of 35 miles there are at least 43 wooden bridges. The government's new modern road will eliminate this type of bridge.

Barium now has two LST's that are being converted to ore carriers. Each is expected to move 9,000 tons of ore per month.



"FLOATING" ore being mined at Barium's concession in Dominican Republic. After "cat" turns up rich lump ore, it is trucked to dock 65 miles away.

DEFENSE

PLANS: Which War Do You Mean?

Industrial mobilization planners take new look at tomorrow's war . . . Damage appraisal brings stress on weapons . . . But they still plan for production build-up . . . Big saving possible—By G. J. McManus.

◆ LAST YEAR'S air raid test jolted industrial mobilization planners. Initial reports didn't seem so bad. Only 25 million casualties and 2 pct of the aircraft production knocked out.

"But then we started going over the whole picture," says Lloyd Mulit of the Defense Dept. "Counting up subcontractors and others, we found we had no aircraft production."

It appeared that the country had fallen into its old habit of preparing for the last war instead of the next one. Plans based on World War II thinking would not stand up in a general nuclear war.

Halt Machine Buying

Out of this realization came a switch in defense production planning. The Air Force with its industrial readiness policy began lining up production facilities it would have to have in a general war. In general there has been a move to stress current weapons rather than future production.

The New Look

One result of the change has been to halt buying of long lead-time machines for the reserve. New policy calls for machines to be yanked out of the reserve whenever current production needs beefing up.

But mobilization planners cannot go overboard on current weapons. For one thing, they must prepare for a protracted and extensive engagement similar to the Korean action. A conflict of this type would call for a planned production build-up.

Secondly, the rate of technological improvement must be considered. If we overload on weapons and neglect future production, we may wind up fighting a war with outmoded equipment.

Finally, there just isn't enough money to pay for a running inventory of the supplies needed to make war. At the close of World War II, defense production amounted to $86 billion a year. Today, the entire defense budget is only $35 billion. When you consider that one of the new jet fighters cost four times more than its predecessor model, you begin to realize we can't afford a full war outlay.

These are just a few of the dilemmas facing mobilization planners. They would like to go into a nuclear war with all vital production coming from dispersed areas. But they can't afford to discourage metropolitan defense production by enacting rigid dispersal standards for procurement. To do so might starve out companies that would be needed for a general buildup.

It Takes a While

Questions of timing, strategic plans and intricate design add to the size and complexity of the problem. It took two years to formulate a program that merely had all the military departments talking in the same planning terms.

To reduce the problem to workable size, planners separated vital from non-essential defense products. They came up with a list of 1000 military items that would be needed to defend against attack and strike back at attackers.

How to Waste Defense Dollars

● CURRENT DEFENSE SPENDING is tied to estimates of how much existing facilities could produce in wartime. If planned production is short of mobilization needs, military services buy enough to make up the difference.

BUT COMPANIES MAY CHANGE the size and efficiency of facilities. If the Defense Dept. is underestimating a company's wartime capacity, needless procurement results.

DEFENSE PLANNERS ASK that you tell them when you modernize facilities, find a way to cut lead time on a defense item, or go into new production.

THE MAN TO CONTACT on changes is the Armed Service Procurement Planning Officer (ASPPO) assigned your plant.

The Army, Navy and Air Force must figure out exactly how many of these items they will need to mobilize.

The individual departments work out their needs. They come to the planning section of the Defense Dept. with the name of a company and the amount of production to be scheduled for wartime.

How It's Done

Mobilization men check in a book called the Department of Defense Register of Planned Mobilization Producers. The register lists 23,000 companies producing war supplies. It cross-references company with the appropriate military agency. It gives the name of the man responsible for coordinating planning requirements of the different services.

If a company was not previously registered when a request for planning comes through, the name is entered and a coordinator assigned. The coordinator sits down with company people. With them, he figures out how much of the department's requirement can be met and how long it will take.

Finally, a tentative schedule of production is worked out. Schedule calls for the company to deliver 30 tanks within a month of mobilization day, 60 tanks in two months and 1000 tanks in a year. It's Winston Churchill's old "drip, dribble, deluge" process except the drip starts sooner because all planning has been done in advance.

For planning purposes, this self-triggering operation has been keyed to an M-day in 1957. Mobilization men hastily tell you this date does not represent any official thinking on when war will come. It's just that planners must have the needs of some specific period in mind.

Keep Defense Posted

Importance of accurate planning lies in the relation of future production to current procurement. For example, Army mobilization plans might call for 10,000 tanks two months after M-day. Tank manufacturers say they can only provide 4000 by this time. To make up the difference, the Army goes out and buys 6000 tanks right now.

Any increase in the capacity available for planning reduces current spending. Cutting lead-time does the same thing. For this reason, defense planners urge companies to keep them posted on new or improved facilities. Pilot production runs, management studies and tests are being pushed as a means of reducing lead-time.

To Avoid Confusion

Defense Dept. people feel there are many companies not registered that should be. Planners would like to get all such companies on the books. Local procurement officials can tell a company whether it is listed in the mobilization directory. Getting registered is a question of convincing procurement people that you have the capacity for defense production.

What the Defense Dept. wants to avoid is a situation like that in World War II. At the start of the war, company officials and military men were running around blindly trying to find each other. No one knew who was buying what and who could make what.

To expedite mobilization, certain mobilization facilities have been stockpiled by the government. These include complete plants, individual machines and integrated production lines. These last have been stored in plants or in central storage areas of the government.

FAR CRY: Army's new radio transmitter-receiver, shown in jeep, has operated at distances over 2000 miles. Developed by Signal Corps and Collins Radio Co., Cedar Rapids, Ia., unit typifies technical gains of services.

Grant Tax Aid

Office of Defense Mobilization has granted fast tax amortization certificates for 33 new or expanded facilities costing $140.8 million in the two weeks ended Dec. 28. Most of the certificates are for electric power generating facilities; petroleum refining facilities.

Largest project granted fast tax benefits is the Pacific Power & Light Co., Wyoming, which receives authority to write off 65 pct of $22.9 million for electric power generating facilities. Ohio Edison Co., Lorain, Ohio, receives a certificate for 65 pct of the $16.9 million cost of similar facilities.

Butte Pipe Line Co., Houston, Tex., was granted permission to amortize 25 pct of $17.8 million for oil pipe line and storage facilities, and the Chicago & North Western Railway Co. 85 pct of $14.1 million for freight cars.

To date, ODM has granted over 20,000 certificates for $33 billion.

FUEL

COAL: Digging Out Of A Bad Slump

Soft coal is making a steady recovery from the blows struck by oil and gas . . . Long-range outlook is good . . . Utility market will bulwark expected growth . . . Steel plays a big role—*By W. G. Brookfield.*

◆ RECOVERY of the soft coal industry from its 1954 depression is more than a flash-in-the-pan. As coal people see it, the industry has come through its worst days, can now look forward to a period of growth.

Industry optimism is based on more than wishful thinking. The "head-in-the-sand" days are gone. For example, coal leaders have checked off the railroad market as beyond recovery due to dieselization.

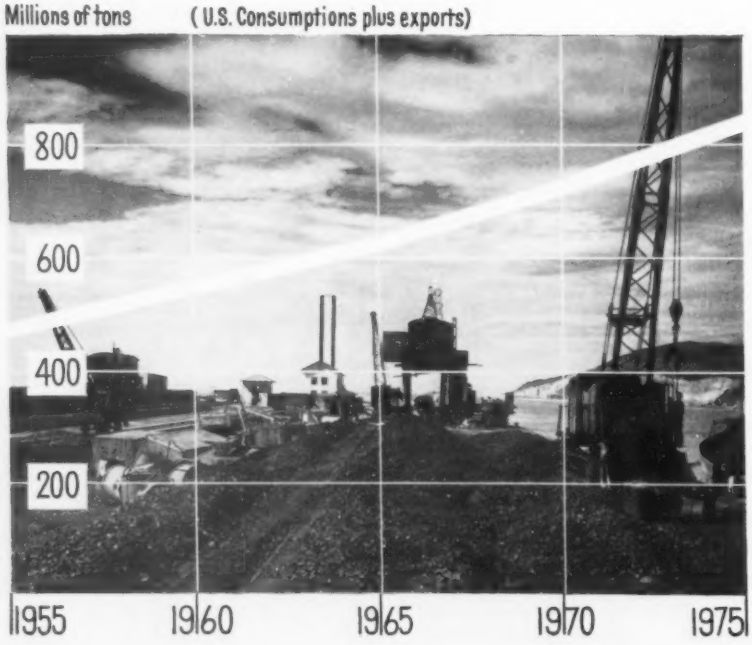
But the industry is counting heavily on the growth of utilities, steel, general industry and exports, in that order. It expects the private home market to show a steady decline.

In 1954, soft coal consumption dropped to 394 million tons, including exports, compared with 460 million tons a year earlier. Last year, it rose to 470 million tons. Industry leaders expect a jump to 540 million by 1960, 620 million by 1965, 720 million by 1970, and 840 million in 1975.

Power Market Outlook

Electric power holds the key to industry optimism. It's expected that by 1975 utilities will be consuming at an annual rate of 400 million tons, compared with an estimated 140 million tons last year. This is based on expectations that oil and gas will be channeled into more economic outlets as reserves dwindle, plus decreasing sources of hydro-electric power. Soft coal will fill the vacuum in power needs.

Charting Coal's Recovery



Continuous expansion in steel will provide a steady increase in soft coal consumption. While efficiencies in blast furnace operation will reduce the ratio of coke per ton of iron, the industry's demands will increase about 40 pct by 1975.

Bulk of the railroad market loss has already been realized, but further attrition seems certain. Even in the event that the coal-fired gas expansion turbine should swing some of the railroad locomotive market away from diesels in the future, the unit coal use in turbine locomotives would be far less than in steam locomotive use.

Those Other Fuels

Home heating use and some small industrial and commercial applications will consume less soft coal in the future, but here again the main loss has already been sustained.

General industrial expansion will be accompanied by the retreat of oil and gas from less economic uses. The eventual use of coal as source material, conversion into gaseous and liquid fuels, and as a source for chemicals, will further increase its future use.

Bituminous exports should see a steady gain. This is based on the combination of world demand for metallurgical and steam coals, the rapid depletion of European mines, and the tight coal situation in Great Britain.

It's Got Problems

The bituminous coal industry is not without its problems. During the past year the shortage of freight cars was often a limiting factor in coal shipments. Adverse decisions in coal freight rates placed a new emphasis on developments to reduce costs.

Bids:

Congress moves to end Pentagon's cosy buying ways.

Congress is going to ground the Defense Department's high-flying negotiated procurement program, and the law-makers are going to make Pentagon buyers prove twice a year that it stays grounded.

The powerful House Armed Services Committee is pushing legislation to remove a war-time blanket authorization for negotiating contracts.

The bill, sponsored by Comittee Chairman Carl Vinson, D., Ga., would permit continued use of negotiated contracts when the business will help small business, disaster areas, or labor surplus areas.

Must Tell Congress

Under the new bill, only Congress will be permitted to declare an emergency for procurement purposes, and thus permit the Pentagon to virtually ignore laws requiring competitive bidding. Present act permits the President to declare an emergency for buying purposes. Lawmakers complain the Pentagon has been using a 1950 declaration by President Truman as a basis for dodging Congress.

Measure would require semi-annual reports from the Pentagon to Congress on how many contracts are negotiated and how many are let by competitive bidding. In the reports, all contracts over $10,000 must be listed separately with the amounts as well as the method in which they were let.

Raise Exemption

Other provisions of the new procurement act will be: Raise from $25,000 to $100,000 the amount of a research and development contract exempt from competitive bid requirements; raise from $1,000 to $2,500 the size of small contracts exempt from competitive bid requirements; and permit the services to use negotiated contracts for purchase of non-perishable as well as perishable food.

DIESEL powered landing craft retriever will operate in as much as eight ft of water to recover landing craft damaged in beach landings. The 101-ton vehicle straddles the crippled craft, hoists it clear, and transports it ashore climbing grades as steep as 20 degrees, if necessary.

Test Blast Details

Improved protection against nuclear attack will be stressed when the Atomic Energy Commission begins a new series of weapon tests at the Eniwetok proving grounds during the spring.

Weapons carrying somewhat less impact than those set off in the 1954 tests will be fired, but the total number of detonations probably will be greater. One device scheduled for testing is a new weapon for antiaircraft use, the exact form of which has not yet been officially described.

For the first time, an American plane is expected to drop a specially designed H-Bomb. This weapon is intended for the destruction of enemy airfields.

Time of the new tests has not yet been disclosed, though the probable date is around May 1. The AEC says air and sea traffic will be notified of control area before operations begin.

Joint task force 7, commanded by Rear Adm. B. H. Hanlon, USN, will conduct the test. Deputy commander for scientific matters is Dr. A. C. Graves of the Los Alamos scientific laboratory.

Satellite Over Miami

Patrick Air Force Base at Cocoa, Fla., will serve as the launching platform when a number of earth satellites are propelled into space during 1957.

The base is suitable to the scientific needs of the artificial moon program, says the Navy, which is managing the three-service program. Components of the rocket that will carry the first satellite aloft will be test-fired before a complete unit is launched.

To improve chances for success in the program, known as Project Vanguard, the U. S. will set off about ten satellite units. Some five or six of these are expected to reach planned orbits.

EXPANSION IN INDUSTRY

Research:

Armour to spend $5 million for expected 50 pct increase.

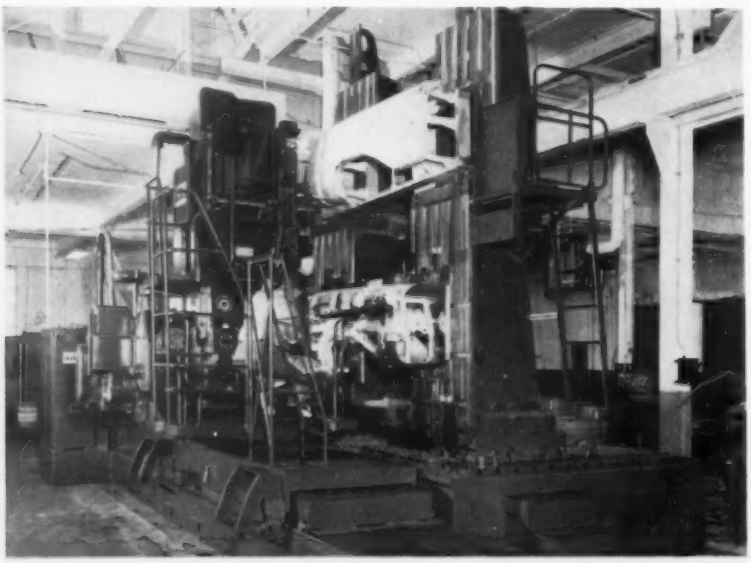
Armour Research Foundation, Chicago, will spend $5 million on a program that will include construction of three new buildings, additions to two more—and a probable 50 pct increase in staff and research projects handled within the next five years.

Currently doing about $10 million worth of research yearly with a staff of 1100 scientists and technicians, Armour foresees an annual volume of $16 million and a staff of 1600 by 1961.

The increased space means more help for industrial firms who want research done but can't provide facilities themselves; or large firms who don't have sufficient scientific manpower to cover all of the research the firm requires. Armour Research is already hip-deep in a welter of projects for both industry and government (342 industrial projects and 170 projects for government agencies in 1955).

Included in the lengthy list: development of what aviation men hopefully call the world's fastest firing 20 M/M aircraft cannon; a 106 M/M tank busting cannon that is called "unprecedented" by people who should know; a smog particle counter; a new self-fluxing, air-proof brazing alloy; a testing device that condenses months of abrasive wear into minutes; even a tortilla flour for the Mexican Republic.

The $5 million program covers a 10 year period. It will include $1.25 million for a physics and electrical engineering building already under construction; a $1.5 million chemistry research building; and a $1 million administration building. The existing mechanical engineering building will receive a $550,000 addition; and the metals research building will be enlarged at a cost of $300,000.



INSTALLATION of new Pratt & Whitney B.G. 22 Keller machine is part of $500,000 expansion making Acme Aluminum Alloys, Inc., Dayton, O., one of the midwest's major tool and special machinery manufacturer.

Double Superalloy Output

Allegheny Ludlum Steel Corp. will build two new consumable electrode vacuum remelting furnaces in an effort to double its capacity for refining high alloy and superalloy steels.

The new equipment will be added to the Watervliet, N. Y., operation. Project is expected to be complete in 90 days.

The total of four furnaces are expected to have a total monthly rated ingot capacity of 500,000 lb.

Main market for increased production will be for jet engine parts.

Expansion Briefs

Stran-Steel Corp., Detroit, subsidiary of National Steel Corp.; manufacturers of architectural products; increase in manufacturing space and fabricating facilities of 20 pct; cost $2 million.

Northwest Chemical Co., Detroit; increase in laboratory and warehouse facilities.

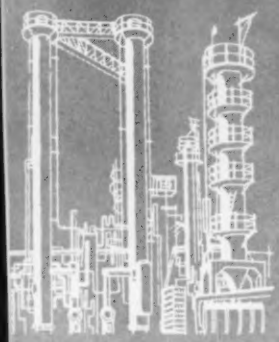
Western Copper Mills Ltd.; new copper mill for producing tubing, pipe, wire, rods and round stock; Vancouver, B. C.; cost $3.5 million.

Retron Corp., Pasadena, Calif.; electronics manufacturer; new factory increases production capacity by 40 pct.

Cory Corp., Chicago; appliance manufacturer; new $100,000 warehouse.

American Can Co.; new container manufacturing plant; Salem, Ore.; cost $1 million.

Alco Products, Inc.; Schenectady, N. Y.; nuclear laboratory; cost $230,000.



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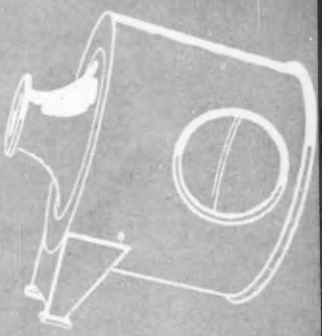
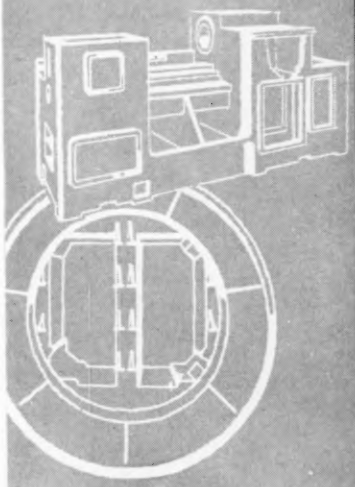
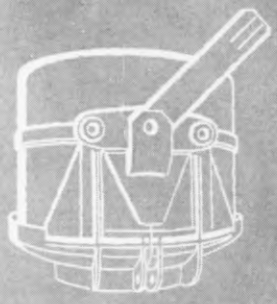
A century is a long, long time. Yet for well over 100 years we have supplied industry with heavy steel plate fabrications. Originally this included power plant boiler construction and maintenance, so our old name, Central Boiler & Mfg. Co., was once appropriate. But for many years that name put us in a niche which we had outgrown. We have not *built* a boiler in scores of years, while we have constructed steel mill equipment, chemical and petroleum processing equipment, machine bases, diesel engine beds, heat exchangers, stacks and other mild and stainless steel plate fabrications. Our steel plate warehousing service is growing; power plant maintenance still remains a valuable part of our business, but we can't be "typed" by our name.

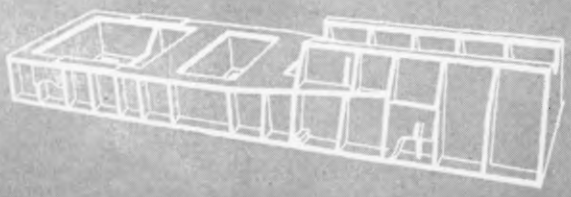
The fourth generation of McGregors has directed the Corporation for ten years. It has grown in size and versatility. Our heavy bending, forming, cutting and joining equipment is the newest and best. Some of it is especially designed and built by us to do jobs only a few fabricators are able or willing to tackle. The McGregor policy is one of uninterrupted progress, the combining of better thinking and better tools in order to produce the more durable, more efficient equipment your problem requires. It's a policy which leads to diversification of services, to customer satisfaction and, inevitably, to growth. We're confident you'll hear our name occasionally in the future—and we hope that your future and ours cross frequently.







For a detailed description of some of our activities, send for our 8-page illustrated brochure.



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VACUUM MELTING OFFERS NEW POTENTIALS

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Superior metals . . . extra strong, extra tough, extra pure . . . are becoming increasingly important to industrial progress. Metallurgical vacuum processing . . . offers new potentials to meet the severest performance demands of modern industry. High vacuum melting has already proven that vacuum furnaces can produce metals and alloys possessing new properties of extraordinary cleanliness, strength, toughness, and uniformity . . . and Kinney Vacuum Pumps are demonstrating their ability to provide dependable, trouble-free service in these new vacuum metallurgy installations.

If high vacuum melting is the field you are considering, look at the outstanding features of Kinney's Model KMB-1200 Mechanical Booster Vacuum Pump.

MODEL KMB-1200 TWO STAGE
MECHANICAL BOOSTER VACUUM PUMP
SPECIFICATION DATA

Ultimate Pressure (McLeod Gauge)	0.1 Micron
Free Air Displacement	1230 CFM
RPM	1800/250
Motor H.P.	10 and 5
Oil Capacity	6 gal.
Cooling	Water
Shaft Seal	Mechanical
Shaft Diameter	1½" and 1⅛"
Inlet Connection	8" Flanged
Outlet Connection	2" Screwed
Separator Tank	Kinney Swirl
Net Weight, Complete	3380 lb.

Complete technical data and performance curves of the Kinney Model KMB-1200, KDH 130 Mechanical Booster Vacuum Pump are available upon request. Competent vacuum engineers . . . in all our district offices . . . will be glad to discuss your vacuum problems with you . . . and prove how a Kinney High Vacuum Pump can make your vacuum metallurgy operation more economical. Send coupon for details. Kinney Mfg. Division, Boston 30, Massachusetts.

● PLEASE SEND CATALOG No. 425 describing the complete line of Kinney Vacuum Pumps.

Our vacuum problem involves.....

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Company.....

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City..... *State*.....

REPORT TO MANAGEMENT

What About a Summer Letdown?

There is a tendency on the part of business to write off 1956 as a year that will be more normal than hectic 1955. The assumption is that it will be subject to such traditional business influences as seasonal slack, summer letdown and the like.

You may be fooled if you let yourself get lulled into that pattern of thinking. You may remember the summer slump of 1955 that didn't happen. The same thing may occur this year.

It's not hard to put the finger on what started this kind of thinking. Falling off of auto sales started the bears, who are always looking for an excuse, on their talk of dire things to come.

But the men who know don't agree. Top auto executives agree that seasonal factors are returning to the market, but still expect 1956 to be their second best. With other segments of business stronger than ever, the scramble for materials will not ease. If you get a premature feeling of summer lethargy, you may be surprised when you come back from your vacation.

Keep Your Inventory Up

Don't let small talk about an easing in the markets for steel, aluminum and other materials lull you into inventory complacency. There are many reasons to maintain a big inventory; increase it if possible.

Don't dismiss the possibility of a steel strike. The odds are now leaning more in that direction as the issues shape up as the type that management feels it can't compromise and that labor won't drop without a struggle.

And prices are going up, steel strike or not. Inventory is money in the bank, and now is the time to build yours up and get it in good balance if you can. You may need stock before you know it.

Is Consumer Credit Too High?

Concern over the high level of consumer credit is not shared by those who have to distribute their products by installment buying. They are concerned the other way, believe that present government restrictions and policies are seriously hurting their sales.

Harlow H. Curtice, President of General Motors, has flatly asked for a change in Federal Reserve Board policies, says concern over auto credit is all out of proportion.

He backs up this contention by calling the level of credit a "reflection of the greatly increased standard of living." GMAC's own terms have lengthened to 28 months for the average car purchase, compared with 24 months 18 months ago.

The average down payment continues to be 40 pct, the average installment is still $80 per month. Repossessions are 2 pct, about the average rate over the years.

Confidence is of signal importance, Mr. Curtice says, when it comes time for the consuming public to make the decision of whether to buy or not to buy. In GM's plans to spend another $1 billion in expansion this year, $250 million not previously announced, is the best reflection of industry's confidence in itself.

If You're Holding Ford Stock

Whether or not you were in on the initial sale of Ford stock, you must have reflected on the sudden paper profits that were registered within minutes after the stock was put on the market.

In the haunts of the financial experts there was a lot of talk about how high the stock would go. (It went on the market at $64.50.) Some were advising the stock would hit at least $72.50 before it dropped and recommended selling at that level.

INDUSTRIAL BRIEFS

Epic Presentation . . . An 800 sq ft exhibit, depicting the development of Iron and Steel in America, has been presented to the Smithsonian Institution, Washington, D. C., by Bethlehem Steel Co. The exhibit traces the discovery of iron ore in 1585, in what is now North Carolina, to an animated flow chart showing how steel is made today. Shown are modern applications such as a jet engine compressor blade, ship propeller shaft, and surgical instruments.

Flying Blind . . . Aircraft Products Co., Bridgeport, Pa., has acquired assets and business of Tactair, Inc., and has thus entered the field of flight control equipment. New automatic pilot for light commercial aircraft which has been under development and flight test by the acquired company for the past three years will be marketed by parent company.

Wrapped In Their Work . . . Ketchum, MacLeod & Grove, Inc., Pittsburgh, have been appointed to handle advertising for Aluminum Company of America, foil products, principally Alcoa Wrap, a newly-developed kitchen foil.

International . . . Clark Equipment Co. has formed a new subsidiary, Clark Equipment International, C. A., to consolidate export functions of the firm's operating divisions throughout the world. The new corporation is being organized under the laws of Venezuela. Domestic branch offices will be established at Battle Creek and Benton Harbor, Michigan.

Steady Expansion . . . Norden-Ketay Corp., manufacturers of gyromechanisms equipment, has contracted to acquire all the assets and business of Gyromechanisms, Inc., Halesite, L. I.

Another Arm . . . Commercial Metals Co., Dallas, Tex., has organized Cometals, Inc., as a subsidiary in Philadelphia. New group will be engaged in buying mixed carloads and truckloads of nonferrous metals for direct shipments in this country as well as for export.

Up North . . . The Wenning Co., Worcester, Mass., has been appointed stamping sales representative for a new territory including Rhode Island, several counties in Connecticut and Massachusetts for Worcester Pressed Steel Co.

Down South . . . Dixie Aluminum Corp., Rome, Ga., has announced plans for the construction of a new aluminum tube mill in Northwest Georgia. The new facility will be a wholly owned subsidiary called Dixie Aluminum Tube Corp. Capacity is expected to be about 400,000 pounds per month of finished tubing.

Two Is Company . . . Development of a process for the chemical milling of magnesium will be undertaken by Turco Products, Inc., Los Angeles and The Dow Chemical Co. under a two-year agreement. Research and exchange of information under the formal agreement will be aimed at perfecting the etchant and improving control procedures and masking techniques. The finished process will be licensed by Turco.

Selling, Charlotte . . . New sales office has been opened in Charlotte, N. C., by Wolverine Tube, Div., Calumet & Hecla, Inc.

Tractor Sales . . . Tractor and Implement Div., Ford Motor Co., has established a Minneapolis district sales office to service dealerships in the eastern two-thirds of Minnesota and western Wisconsin.

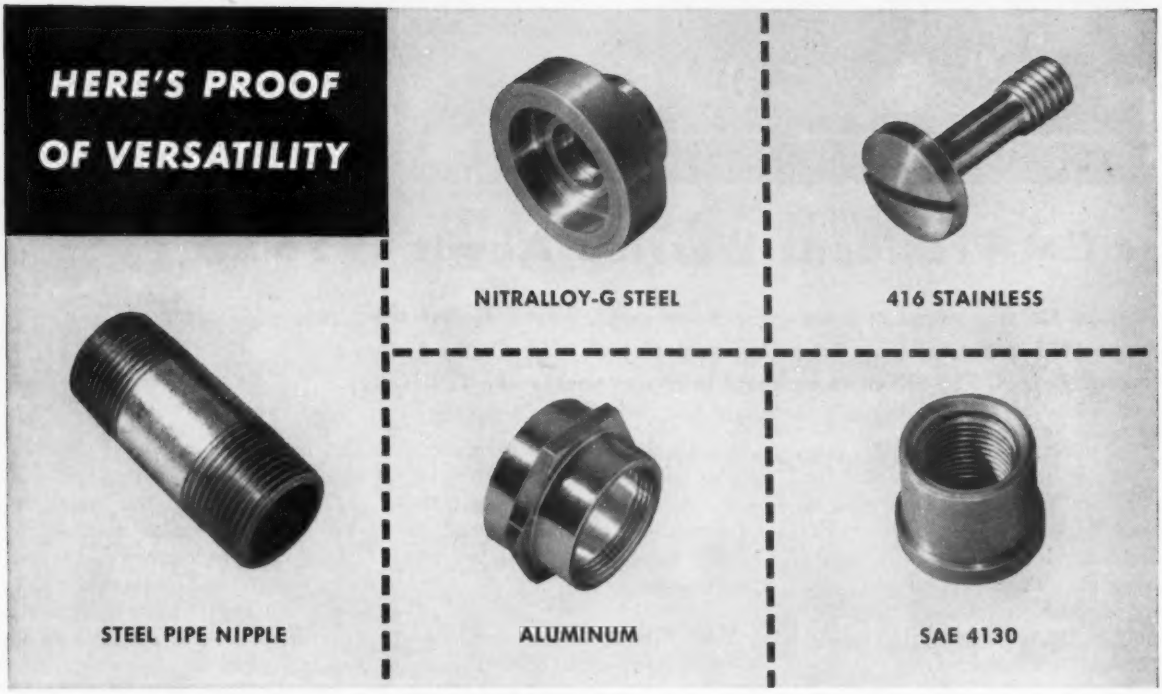
Oriental Markets . . . Goss Printing Press International, S. A., a subsidiary of The Goss Printing Press Co., Chicago, has licensed the Hamada Precision Machinery Co., Japan, to manufacture the Goss Headliner press for Far Eastern market. Action is the direct result of the purchase of a headliner press by the Mainichi newspapers, publisher of one of the world's largest dailies, *Mainichi Shimbun*, with a total circulation of more than 7 million.

South of the Border . . . The National Supply Co. of Mexico, S. A., has been formed as a subsidiary of The National Supply Co., Pittsburgh, major manufacturer and distributor of oil field machinery, equipment, and pipe, with headquarters in Mexico City.

It Can Be Done . . . Stuart McLain and Raymond O. Brittan, of the Argonne National Laboratory reported that the chances of an atomic power plant causing serious damage to the surrounding area can be eliminated by proper plant design, and responsible management, to the Nuclear Engineering and Science Congress.

Rock-A-Bye Baby . . . Between 1940 and 1955, the number of dependents per 100 producers in the U. S. rose from 60 to 73, according to an analysis of population recently completed by the National Industrial Conference Board. For the purpose of the analysis, dependents were defined as persons under 18 years and 65 or more. The country's producers are persons 18 to 64.

More Spring . . . California Spring Co., manufacturer of springs, wire forms, stampings and small assemblies, has begun operations in its new 70,000 sq ft, $1.5 million plant in Los Angeles.



SUN DEVELOPS VERSATILE NEW CUTTING OIL FOR SCREW MACHINES AND JOB SHOPS

New cutting oil, Sunicut 5534, is moderately priced... gives excellent machining results on wide range of steels

New Sunicut 5534 is a non-emulsifying, transparent cutting oil specially compounded to give above-average machining results to operators who want a single oil to machine a large variety of ferrous metals.

Tests have proved that new Sunicut 5534 meets this demand for an all-purpose cutting oil. It is ideal for general screw machine and turret lathe work. It is also excellent for tapping, drilling, threading, and light stamping operations. In addition, new Sunicut 5534 can be used on many special machining jobs, both high and low speed, with metals ranging from B1112 to 4130 as well as free-machining stainless steels.

For complete information about new Sunicut 5534 and how it can help you reduce your oil inventories... lower your production costs... see your Sun representative. Or write SUN OIL COMPANY, Phila. 3, Pa., Dept. IA-1.

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Is GM President Worried About 1956?

Harlow Curtice shows concern over credit curbs, warns against too much 1957 model talk . . . But he is confident that 1956 will be history's second best . . . $1 billion to be spent in improvements—*By T. L. Carry.*

◆ IS GENERAL MOTORS running a little scared? That was the big question at GM's Motorama in New York last week. Harlow Curtice's reputation as a consistently accurate business forecaster and his opinions regarding the economy in 1956 are the main reasons the question is being asked.

The scare talk became evident when the GM president emphasized many points that would help bolster the economy as a whole and the automobile business in particular.

There were many thought-provoking comments from Mr. Curtice. Among them were:

1. His criticisms of the government's policy on consumer credit.
2. His insistence that 1957 cars are not going to be as revolutionary as some people suspect.
3. The announcement that the corporation is going to spend $1 billion in 1956 for capital improvements.

Most Allocated . . . The statement regarding the $1 billion is peculiarly significant. Most of the money involved has already been allocated and new spending not previously announced this year will amount to about $250 million.

The announcement, however, received wide coverage in the daily papers. So much so that some cynics were asking why all the fuss about an expansion that has been announced previously.

The answer is obvious. It's the first time in history that GM has spent that much money in one year. But it is not the first time that the corporation has taken the bull by the horns and poured money into the economy when there was a possibility that business might not be as good as it has been.

Regarding the present trend to tighten credit, Mr. Curtice was quite outspoken in his efforts to have the government leave well enough alone. The G M president's contention is that there has been too much attention paid to what he calls a normal situation.

Financing Sound . . . The average downpayment on a new car financed by GM today is 40 pct of the original purchase price. Contracts for repayment of loans run for an average of 28 months and monthly payments average $80. This $80, incidentally, accounts for 17 pct of an average householder's expenses, compared to 21 pct a few years ago.

Repossessions are at the rate of 2 out of every 100 cars sold.

So, according to Mr. Curtice, the deals which involve no down payment with 36 to 48 months to pay are the exception.

Revolution or Evolution . . . Another attempt to bolster the 1956 market was made when Mr. Curtice remarked that the 1957 models are not going to be as revolutionary as some people have been led to believe.

Certainly, automakers don't want to discourage anybody who is in the mood to buy an automobile. As a result, Mr. Curtice took

SHORTLY AFTER underwriters shown here signed contracts for Ford stock, stock went on sale at $64.50 per share. Paper profits reached millions within minutes. For more on Ford stock sale, see p. 47.

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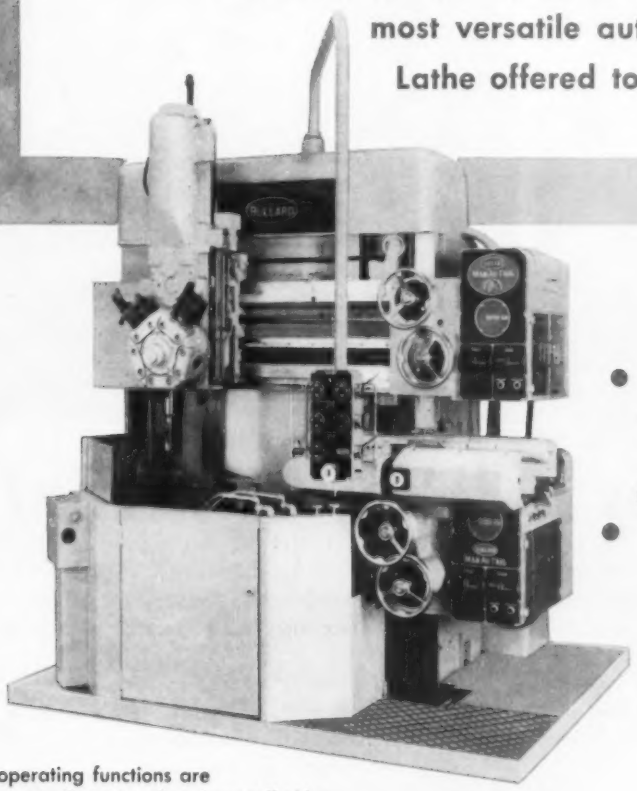
Yes, Bullard Cut Master, Model 75 with Man-Au-Trol Conversion Unit is the best . . . most versatile automatic Vertical Turret Lathe offered to industry today . . . . .



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All operating functions are automatically initiated and controlled by one function control drum and two detector drums in Man-Au-Trol: Table Speeds (20 Available), Feeds (16 Available), Head Travel in feed or traverse, right or left, up or down or 45° in any quadrant and Turret Indexing.

Since the function control drum can be pre-set for a given job in advance, the machine down time for job change-over is reduced to a minimum.

The Man-Au-Trol Conversion Unit can be applied to any or all heads of Cut Master, Model 75 right in your plant.

Your Bullard Sales Engineer will be glad to explain the many other advantages offered by Man-Au-Trol — your best buy in an automatic vertical turret lathe — call him or write for our new catalog.

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NEW MAN-AU-TROL, MODEL 75 CATALOG

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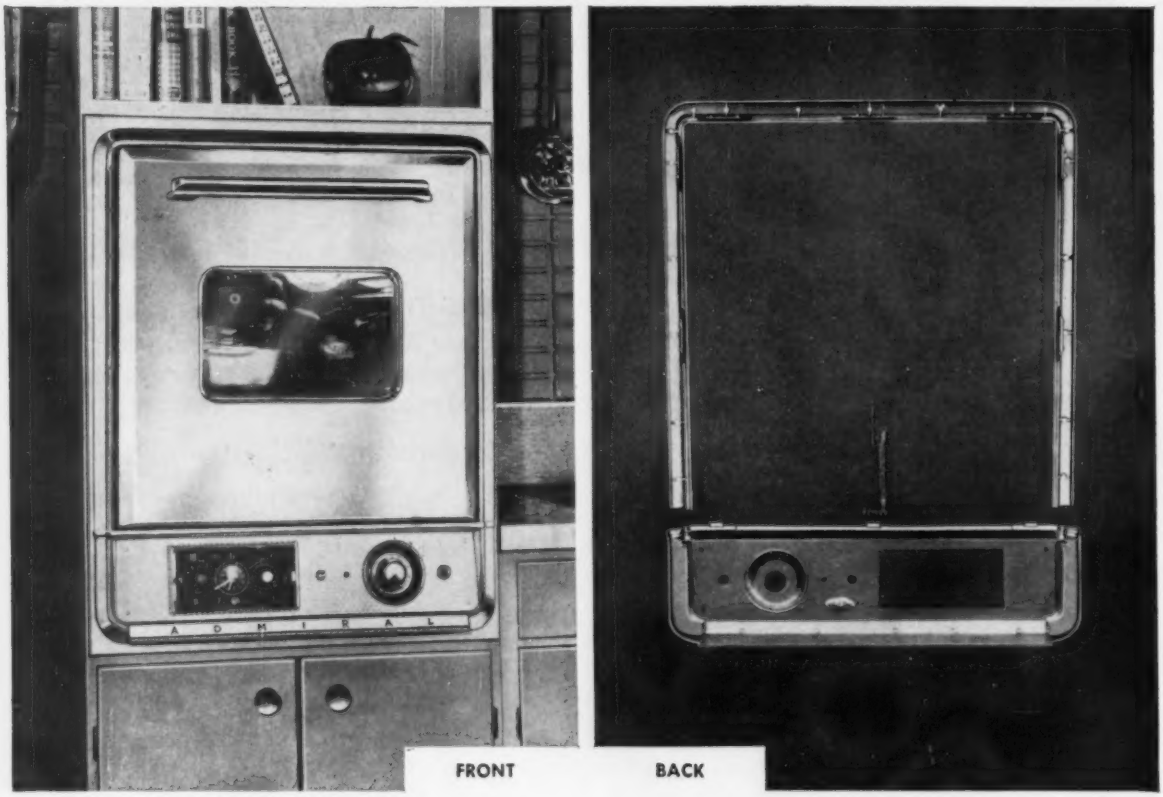
WHY ZINC RATES FIRST IN DIE CASTING • NUMBER 6 OF A SERIES



FRONT BACK

rigidity – as needed by **Admiral**

Built-in electric ranges and wall ovens are the latest products of the fertile minds of appliance designers. And the most efficient methods and materials are employed for each component of the new space-saving cooking units. The illustrated custom wall oven by Admiral, with its ZINC die cast inverted-U door frame and control panel, is an excellent case in point.

Obviously the frame and panel (back views above) could have been stamped from sheet metal, but not with the qualities and economies of these ZINC die castings. Stampings not only would lack the desired rigidity, but would not possess the following additional advantages obtained with die castings:

1. No scrap loss
2. Integral mounting bosses for easy assembly
3. Dimensional accuracy for perfect fit of mating parts
4. Bold raised lettering on the control panel
5. Smooth as-cast surfaces which—being ZINC—take, and hold, beautiful chromium plating applied by commercial methods

Watch for other examples of ZINC die casting economies in our future advertisements. Send for our brochure and contact any commercial die caster for the answers to your particular production problems.

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FOR DIE CASTING ALLOYS

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The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) **ZINC**

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Jan. 21, 1956	153,137*	25,556*
Jan. 14, 1956	156,004	25,743
Jan. 22, 1955	161,165	23,197
Jan. 15, 1955	167,071	23,084

*Estimated. Source: *Ward's Reports*

great pains to point out that next year's cars are not going to be too much different.

Regardless of the feelings on the subject, the 1957 models are going to be truly "revolutionary" compared to this year's cars.

It is an open secret that such things as fuel injection, air suspension, smaller wheels and lower looks are in the cards for 1957.

The tooling orders that have already been placed in Detroit discount anything the General Motors' president has to say regarding "evolution" as opposed to "revolution" in auto design.

Watch Changeovers . . . Everyone knows that next year's cars are going to be quite different from anything that has heretofore been introduced. The big question regarding the new models is how soon they can be put into production.

If business this year is slower than expected, informed observers believe that the auto companies will introduce their new cars much earlier than they normally would.

This objective might be the fond hope of more than one producer but from a practical standpoint, it is hardly possible.

With delivery time on automatic machine tools anywhere from 14 to 18 months, the auto companies will be lucky if they can move their introduction dates up as much as one month.

In the meantime, the industry, and General Motors in particular, is doing everything it can to increase the number of cars to be sold this year.

Realistic Attitude . . . General Motors is not running scared. Neither is Mr. Curtice pessimistic regarding the business outlook for 1956. It is more accurate to say that the corporation is taking a realistic attitude to the problems of helping business in the coming year.

Regardless of the propaganda that originates from various sales departments, it is important for business to realize that it can't have two sales years in a row which will equal the amount of business done in 1955.

This does not mean that the economy is going to the dogs. It merely means a slight dip in the upward curve of business.

Ford Stock:

Blue chip stock will soar, then stabilize.

The sale of Ford Motor Co. stock has led to some interesting speculation regarding the Company.

Opinion on the subject varies from one person to the next regarding the price at which the stock was offered compared to the price it immediately brought.

The price, originally set at $64.50, rose near the $70 mark after the first day of trading.

Because of this, some people think that the company deliberately underpriced the stock. This is hardly the case.

Frantic Buyers

The main reason for the increase in price is the mad scramble that has ensued since it was first announced that the stock would be put on sale.

Investors and speculators know that Ford is a blue chip company and that any investment in the firm will result in good dividends.

It is possible that the Ford Foundation realized that once the stock was placed on the market it would automatically go up because of the urge of investors to buy it.

But like anything else, what goes up must necessarily come down. So in the next few months, you can look for the price of the stock to hit a peak, decline a few points and remain stable.

THE BULL OF THE WOODS — **By J. R. Williams**

GET OUT OF THESE THINGS QUICK! HERE COMES THE BULL!
NOW YOU'RE GONNA SEE A MIRACLE-- THEY'LL COME OUT FROM BEHIND THAT COLUMN AS INNOCENT AS LAMBS! A LAMP-POST WAS ALL THAT A TOWN CUTUP EVER NEEDED FOR A DRESSIN' ROOM!
WHAT GOES ON BEHIND THE SCENES IS A LOT MORE INTERESTING THAN THE SHOW!
J.R WILLIAMS
1-25
QUICK CHANGE ARTISTS
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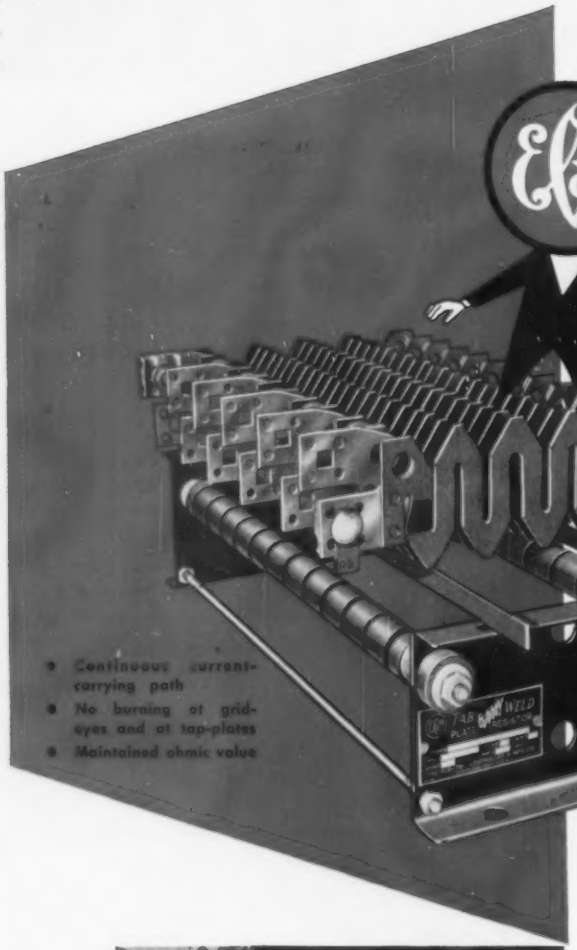
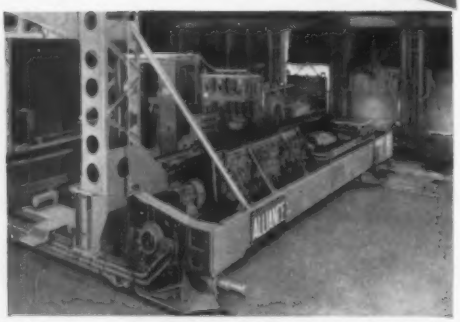
TAB-WELD RESISTORS



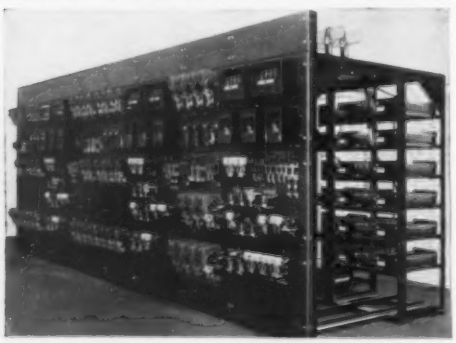
first in design
first in performance
first in economy

EC&M TAB-WELD Plate Resistors have set new standards for performance, ease of specifying, selection and stocking of spare sections. These sections use one construction throughout (the TAB-WELD design) which has proven successful in hundreds of installations on cranes, charging machines, unloaders, screwdowns and other steel mill auxiliary drives.

For efficient results and maximum economy in use, application and service, EC&M TAB-WELD Plate Resistors offer top performance. Specify "EC&M TAB-WELD" . . . the proven resistor-section.



Chargers . . . the acid test of resistors where EC&M TAB-WELDS operate trouble-free.



Factory-assembled Screwdown Control . . . no periodic nut tightening with TAB-WELD Resistors.

Also for battery-chargers, smoke precipitators and similar applications...

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Are Planes Giving Way to Missiles?

Experts call guided projectile the ultimate weapon . . . No defense now known . . . New thinking brings $1.3 billion request for development and buying . . . Where will contracts go?—*By G. H. Baker.*

◆ DEFENSE contractors and subcontractors can expect to hear a lot more from the government about guided missiles in the months ahead.

Top military men are planning to broaden the Pentagon's missile-buying program so as to bring many more firms into the production picture.

Up to now, only about a dozen firms—chiefly aircraft companies—have been engaged in missile work. Starting this summer, the number of firms is to rise sharply.

Rate Missiles High . . . Guided missiles are rapidly becoming the nation's number one weapon of defense. It is entirely possible that the controlled missile may one day soon replace the human-piloted aircraft as the most effective military weapon for either offensive war or defensive war.

The flying robots fired from Germany to Britain in 1944 are like Model T Fords when compared with the grim, accurate, long-range guided missiles of 1956.

Today, both the United States and Russia are pushing development of the intercontinental ballistic missile (IBM). The IBM is also referred to by military experts as the "ultimate weapon," because there is no known defense.

Get Top Backing . . . President Eisenhower gives full recognition to the seriousness of the guided missile program in his new budget for fiscal 1957. He emphasizes that we live in an age of nuclear weapons, and that we must perfect high-speed ways to deliver these weapons.

He warns against the old familiar trap of thinking of the next war in terms of past wars. New wars invariably are fought with new weapons, new techniques. Mr. Eisenhower reminds the Congress that weapons considered to be the "last word" in the Korean war may well be obsolete today.

What He Wants . . . Ike is asking Congress for $1.3 billion to push development and purchase of guided missiles. This is by far the largest amount ever spent on such weapons. It is 39 pct more than we are spending in the current fiscal year on missiles.

It's all part of the long-range program Secretary Wilson calls "more bang for a buck." It's a crude version of automation, actually, applied in this case to the science of making war. The nation, under Ike, has greater striking power, stronger defense, and it's done with far fewer men in uniform than ever before.

"Push-button warfare" is no longer a fantastic dream. It's rapidly coming within reach.

Hit Labor Crooks . . . Ike's anti-racketeering lawyers won 39 convictions against labor crooks last year.

In addition, according to a new Justice Dept. report, the federal government obtained 14 convictions for violations of the Taft-Hartley law, and seven convictions against labor representatives

Industrial Scene Changes

● Business study just revealed by the U. S. Commerce Dept. shows a very high degree of turnover in the ownership of American firms, but a comparatively stable number of businesses.

● More than 60 pct of the 4.2 million firms operating at the end of 1954, the study indicates, were acquired by their owners after the end of World War II. About 30 pct of all the firms were more than ten years old, while 12 pct had been open as little as six months.

● Since 1945, there has been an even chance that a firm newly founded or bought would last about two years under the same management.

Let American Welding handle the job!

The next time design requires a circular weldment, or you think fabrication of a complicated weldment might be the best solution, give us a call. Our Industrial Products Division stands ready to assist manufacturers with problems involving fusion or resistance welding of all types of metals. In addition, we are actually a complete manufacturing plant with the "know-how," the manpower, and the facilities to handle the operations required to produce finished welded components of complex design or assembly. Send today for our new 24-page catalog describing American Welding facilities that are available. Let us demonstrate what American Welding can do for you.

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for violations of criminal tax statutes.

In a final report on its 1955 activities, the Justice Department's criminal division says it also broke up fraudulent operation in government housing programs, dealing in illegal barbiturates, mail theft, and organized stealing of automobiles.

Big gain in number of convictions is due to a series of shakeups in the Justice Dept. under the Eisenhower Administration. U. S. attorneys, under Ike, are now full-time prosecutors.

Seek Foundry Sale OK

General Services Administration, busy in recent months answering various congressional criticisms, isn't going to take any chances in selling its New Castle (Pa.) foundry.

Edmund F. Mansure, GSA administrator, is giving the Senate and House Government Operations committees a chance to look over details of his proposal to sell the foundry to United Engineering and Foundry Corp. before going ahead with the deal.

The foundry, which represents about 40 pct of the heavy casting capacity of the country, has been operated by United since it was built in 1942 at a cost of $23 million. United offered $4.5 million for the facility last year, but it was rejected. Although GSA has not officially announced the latest bid, it is believed to run about $7,750,000.

GSA says it is ready to sell the plant if the committees voice no objection to the deal.

Distress:

See broad support for ailing area program.

Ike's new plan to aid distressed areas calls for creation of a revolving area assistance fund to be used in granting up to $50 million in loans.

Money will go to buying, building, converting, or enlarging industrial plants in communities where joblessness is high. Another $1.5 million could be granted annually for technical assistance, such as sizing up the economic growth potential of these cities and towns.

Funds would be apportioned under authority of the U. S. Commerce Secretary, working through an "area assistance administrator" whom he would appoint. The appointee would be a $15,000-a-year official.

Limit Plant Aid

Loan applications with state agency approval will be considered, but if financial help is available from other federal agencies or from private lenders on equitable terms, the area fund is not to be tapped. A maximum span of 20 years will be applied generally to the term of loans from the fund.

Financial help in buying or developing plants is to be limited to 25 pct of the aggregate cost. State and local groups will be required to put up at least 15 pct of the total investment, to insure participation by groups most closely concerned.

Where It Goes

Areas considered eligible for federal assistance will be those certified by the U. S. Labor Secretary as having an unemployment rate which now is, and for the major part of the preceding two years has been, 8 pct or more. This standard is slightly different from that used by the Labor Dept. in determining where "substantial" unemployment exists.

An area of serious, or substantial, joblessness is one wherein at least 6 pct unemployment is found. Latest reports to the department show 19 major areas (16 of them in the continental U. S.) and more than 60 minor ones answering this description. Major areas range from Massachusetts to Minnesota and south to North Carolina.

Capitol Hill comments indicate considerable support for the proposal.

"WE'RE just an average family."

Trusts:

President asks added funds to police merger moves.

Wave of antitrust investigations and attacks on big business apparently is paying off. The election-conscious Eisenhower Administration is going to toughen up its antitrust and antimerger activities.

President Eisenhower, in his budget for the fiscal year beginning next July 1, is asking for hefty increases for four government agencies charged with regulating business.

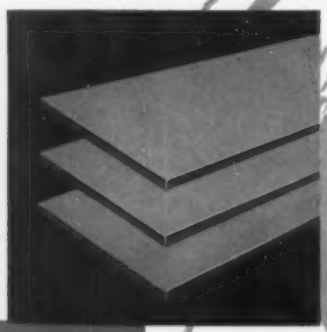
Ike wants Congress to add about $1 million to budgets of Federal Trade Commission and the Justice Department's antitrust division, and increases for The Securities and Exchange Commission and the Interstate Commerce Commission.

Push Merger Curbs

"As our economy grows and becomes more complex, the responsibilities of federal agencies regulating business also increase," Mr. Eisenhower says. "While the amount of money required to finance these agencies is relatively small, their influence on economic growth is very significant.

Meanwhile, Chairman John W. Gwynne, Eisenhower - appointed chairman of the FTC, is asking Congress for tough new laws to halt what he terms a tide of corporate mergers.

meet the Claymont family . . .



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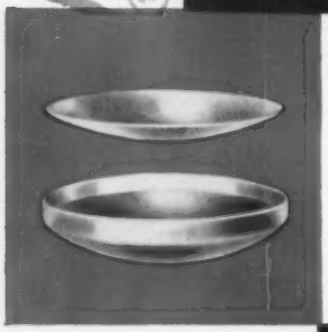

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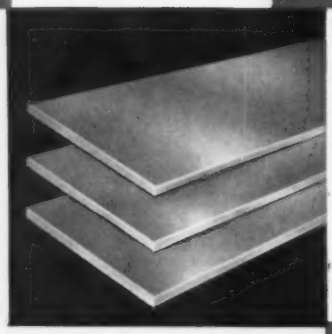

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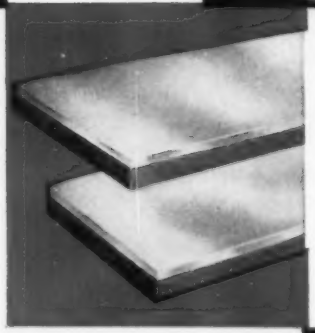

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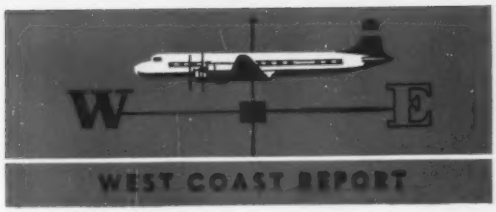

Aluminum Worried About Waterpower

Primary producers finding themselves in competition with their customers for firm power contracts . . . Lack of dam building activity detriment to general industrial expansion—By *R. R. Kay.*

◆ LACK of new dam starts to provide additional waterpower is giving the Far West primary aluminum producers the jitters.

They would like to expand further. But they can't unless they can look ahead to more firm waterpower.

Last year the Far West accounted for 33 pct of the primary aluminum produced in this country as compared to 52 pct in 1949.

Most Stays . . . Aluminum produced in the Far West stays here to supply aircraft companies and other thriving industries. And general industrial growth in the West offers more close-to-home markets.

However, this general industrial growth is proving to be a liability as well as an asset because of the shortage of new sources of waterpower.

The increase in business has increased the demand for power. Aluminum companies find themselves in competition with their customers. If a producer controls a particular source of waterpower, that means a local market may not be able to expand within that area. If the aluminum fabricator contracts for power, then the producer may be in a position where he can not supply the additional metal.

Situation Bad . . . But the producers are more worried about the future. They say that unless there is some new dam building launched right away there will be no additional power on the lines by 1960 or 1961. In 1955 a new company entered the field of primary aluminum production. Anaconda Aluminum located in Columbia Falls, Montana because a native California firm was able to garner a power contract which it exchanged for, among other things, 5 pct share in the new operation.

In 1956 another new firm will probably enter the field. But Olin Mathieson will locate in West Virginia and probably burn coal for power.

Basically, the West feels that the availability of waterpower is a good index of industrial potential. They feel the future is dark unless something is done to assure a continuing supply.

Mergers . . . They're running high here. Business goes where the population goes. These companies are strengthening their West Coast position to take care of increased consumer and industrial business:

Kaiser Aluminum & Chemical Corp., Oakland Calif., bought Foil Kraft, Inc., Los Angeles, producers of aluminum containers for the frozen food industry. . . Republic Supply Co. of Calif. bought Thomas P. Pike Drilling Co., Los Angeles. . . Curtiss-Wright Corp. bought Propulsion Research Corp., Santa Monica, Calif. . .

Kelite Corp., Los Angeles, makers of industrial cleaning and processing chemicals and equipment, bought Chemtox Co., Ltd., Hawaiian chemical firm. . . Hoffman Electronics Corp., Los Angeles, bought Semiconductor Products Co., Evanston, Ill., solar battery manufacturers. . . Packard-Bell Co., Los Angeles, acquired Technical Reproductions, Inc., North Hollywood, Calif., printed circuit makers. . .

Norris-Thermador Corp., Los Angeles, bought Industrial Fabricators Co., Burbank, Calif., makers of aircraft parts and kitchen cabinets. . . Industrial Techtonics, Inc., Ann Arbor, Mich., purchased Anti-Friction Bearings Co., Los Angeles. . . J. D. Polis Mfg. Co., Chicago, bought the Chicago and Los Angeles plants of Blair Pin Bolt Co. . .

Fuller Co., Catasauqua, Pa., a subsidiary of General American Transportation Corp., bought Sutorbilt Corp., Los Angeles, makers of pressure blowers, pneumatic conveyors, fans, and material feeders. . . Standard Screw Co., Chicago, acquired controlling interest of Ravenna Metal Products Corp., Seattle, manufacturer of aircraft parts.

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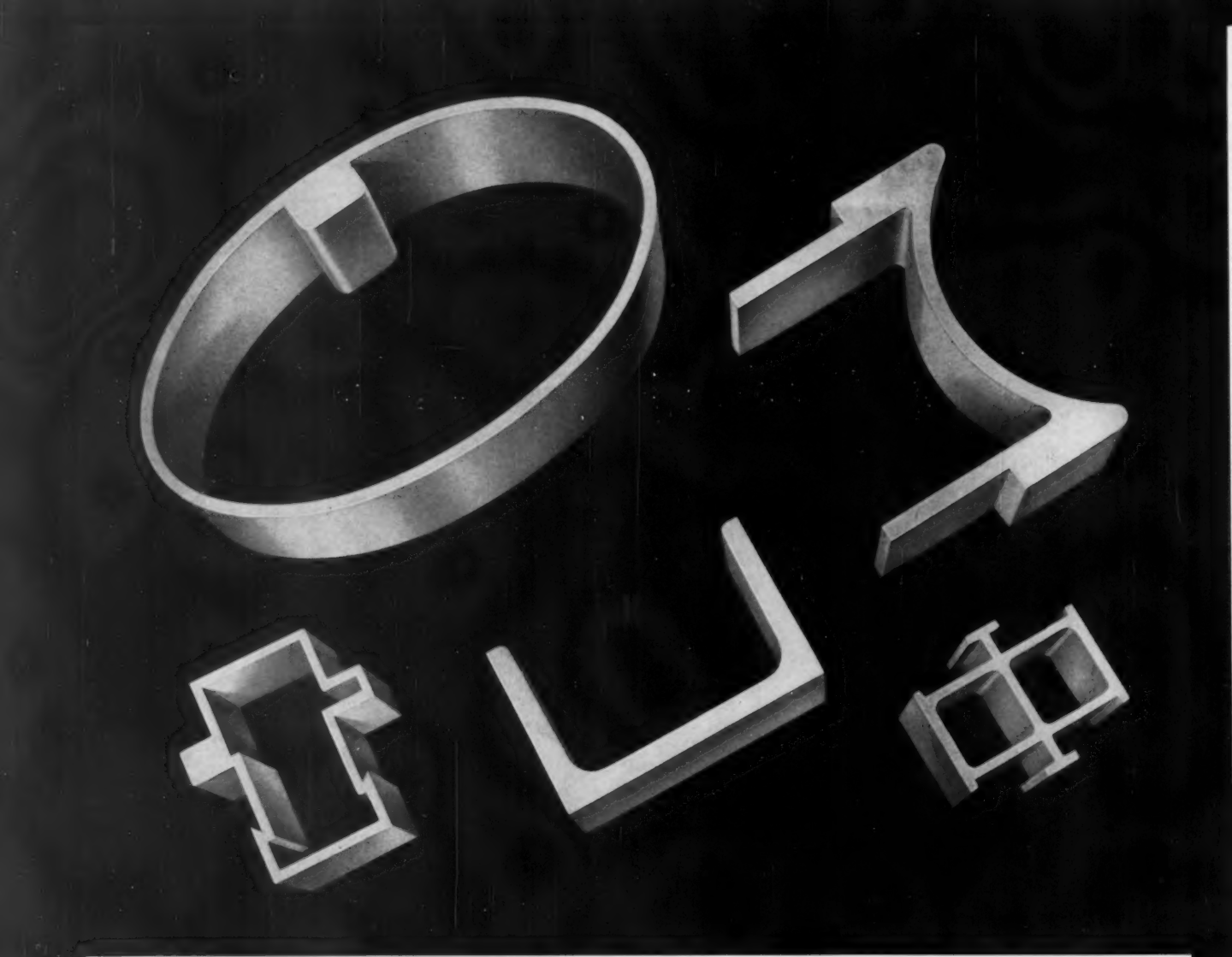

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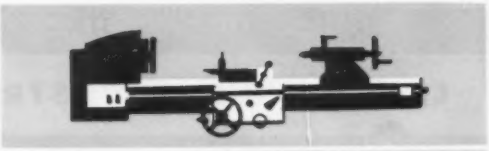


MACHINE TOOL HIGH SPOTS

Defense Dept. Utilizes Tool Reserve

Tools can be borrowed from reserve for some defense work . . . New policy permits use when neither industry nor military have necessary tools . . . Means modification of Vance Plan—By *E. J. Egan, Jr.*

◆ IF YOU'RE USING machine tools to produce something one of the military services needs in a hurry, you might be able to borrow some faster, more up-to-date equipment from the Defense Department's reserve supply.

According to a recent decision of the Defense Dept. and the Office of Defense Mobilization, reserve tools can be placed in service: (1) in non-emergency times; (2) when neither industry nor the military central inventory has such equipment.

Equipment borrowed by industry is to be returned to its original reserve package (if required) when replacement tools are ready. All packaged tools are to be reviewed annually. Those no longer essential to the reserve will be put in the large central inventory, from which they may again be withdrawn if they are needed

Large Reserve . . . Tools that the armed forces hold title to are estimated at between 400,000 and 500,000 units. It's unlikely that the total is going to shrink appreciably. Some will be weeded out from time to time as being too obsolete for current or future defense needs, but these will be replaced by newer tools returned by civilian borrowers, and from reserve packaged lines that are broken up.

Does this new line of thinking by defense officials torpedo the original "Vance Plan," which recommended a whopping reserve of equipment that would grow steadily year by year? Military men say not exactly. They still consider the Vance Committee proposals of 1953 to be basically sound.

New Thinking . . . This means that defense planners still want new metalworking equipment, all right. And they're apparently not going to be bashful about asking Congress for the money whenever they decide what they want to buy. But from this point on, the new thinking and the 1953 thinking part company; now the idea is to put the tools right to work instead of shoving them into cold storage.

So by loaning out top-grade reserve tools to current arms production lines, and augmenting these with newly purchased equipment, the military is mounting a double offensive against delay and inefficiency.

And the Defense Dept. says it hopes to take advantage of economies resulting from operation of this more efficient metalworking machinery.

What's Behind It . . . Moreover, the Pentagon says there are other reasons behind the policy decision. It was made to: (1) meet the ever-changing needs in what is considered the best tooling for current military production as well as M-Day plans; (2) insure the existence of a modern tool inventory; (3) allow for training of personnel in the operation of new tools; (4) provide a more realistic basis for reviewing military requirements for machine tools.

Recent action by the Air Force is in line with this new outlook. This service branch, in the past two years, had been allocated $84 million which it could use to buy equipment designated for reserve status. But the bulk of the money was never obligated and was voluntarily returned to the Treasury a couple of months ago.

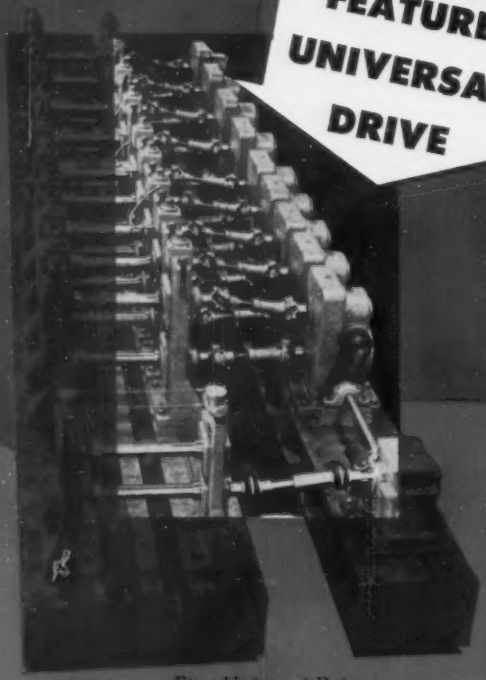
For Immediate Use . . . Instead, the Air Force is planning to spend about $53 million from current operating funds for machine tools that will go right into current production as soon as they can be delivered. And in future years, according to present thinking, the Defense Secretary will ask Congress for annual appropriations to buy tools for propping up lagging production schedules.

Harold S. Vance, head of the committee which proposed the standby machine tool program three years ago, was consulted on the ODM-Defense Dept. policy shift, and is reported to agree with the change in plans.

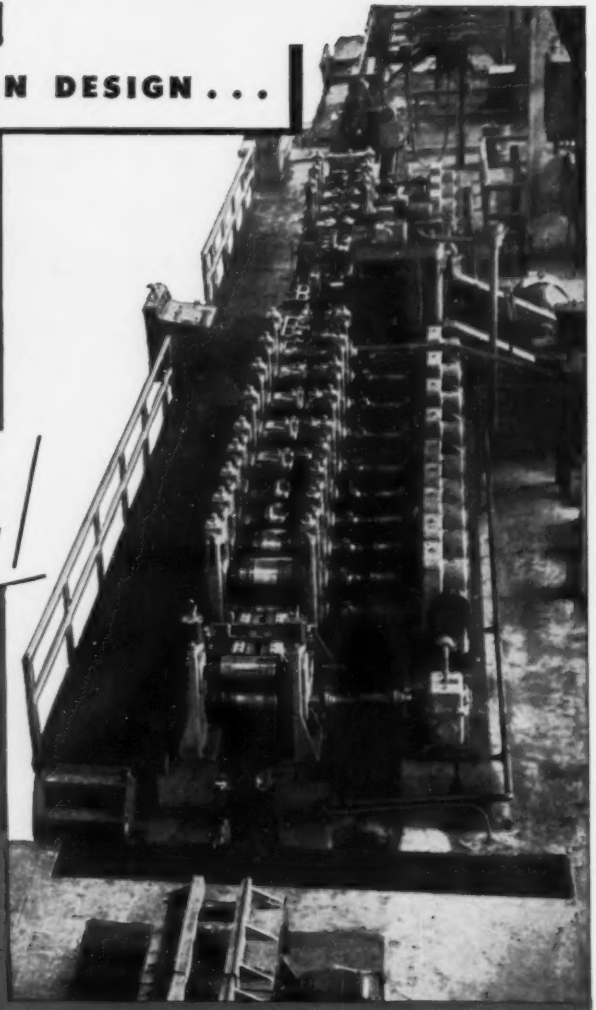
LUDLOW KING has joined staff of the National Machine Tool Builders Assn. as assistant to executive vice president from his former position as vice president, Plastics Div., Universal Moulded Products Corp.

LEADING THE INDUSTRY IN DESIGN . . .

Etna TUBE MILLS FEATURE UNIVERSAL DRIVE



Etna Universal Drive



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The Iron Age SALUTES

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Current diversification trend raises the question: Where do you get the men to run a diversified business? At the Eddystone division of Baldwin-Lima-Hamilton, they make testing equipment, hydraulic presses, turbines and transportation equipment. Over a hundred different markets are covered.

To make an operation like this tick, there must be someone at the top who can handle himself on all fronts. Answer to this need at Eddystone is a square-jawed Scotsman named Andy Liston. General sales manager of the division, Mr. Liston is a decisive, forthright executive. There's no danger of his getting tangled up through saying one thing to a tool customer and another to a turbine buyer. He's a straight talker and he has the background to talk sense in a variety of situations.

He has been with the Baldwin group since 1931, coming into the company through his association with I. P. Morris and the De La Vergne Co. He started in the shops, went into hydraulic turbine manufacture, and worked into engineering. He was in on the design of T.V.A. and Hoover Dam turbines, headed an engineering group that designed large aircraft catapults. This last led to assignment in steering engine and other special engineering projects, rounding out his technical background.

In 1942, he moved into sales work. Two years later, he became sales manager for hydraulic turbines and marine products of the Southwark division. His responsibilities steadily broadened, bringing him into contact with diesel engines, propellers, steering gears, defense products, and others. Finally, in 1954, he was made general sales manager of the Eddystone Div.

Mr. Liston studied mechanical engineering at the Drexel Institute of Technology. He is on the board of directors of American Hydraulic Corp. in New York, has served on several industrial advisory committees of the federal government. He is chairman of an import committee of the National Electrical Manufacturers Assn., is actively concerned with the problem of foreign competition.

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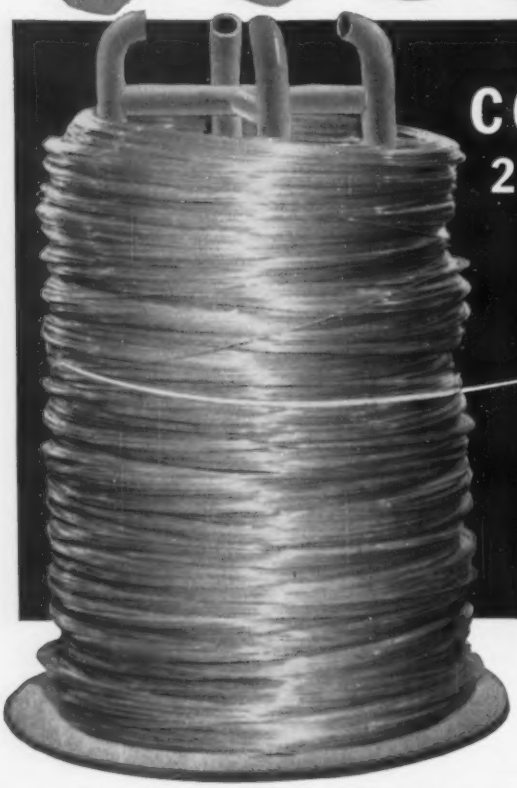

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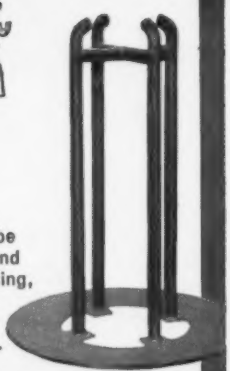

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The Iron Age INTRODUCES

Karl G. Jansson, elected president, **The KeMalloy Corp.,** Shreveport, La.; **J. W. Diamond,** elected vice president; **James H. Lowe,** elected vice president; **William H. Lenz,** elected secretary and treasurer.

Matthew J. Fleming, Jr., appointed president, **Harris Products Co.,** Cleveland.

Kenneth H. Gayle, appointed president, **Delta Tank Manufacturing Co., Inc.,** Baton Rouge, La.

Charles J. Lee, elected vice president, **Wilson Steel and Wire Co.,** Chicago.

James A. Badaluco, appointed assistant vice president, **Hanson-Van Winkle-Munning Co.,** Matawan, N. J.

Smith A. Goff, elected vice president, **Duro-Test Corp.,** North Bergen, N. J.

Russell L. Lepley, elected vice president and general manager, **Connellsville Manufacturing & Mine Supply Co.,** Connellsville, Pa.; **Paul A. Doorley,** appointed vice president and secretary-treasurer.

U. M. Johnson, elected vice president, industrial sales, **Easton Car & Construction Co.,** Easton, Pa.; **George D. Fraunfelder,** elected vice president, engineering.

Richard B. Tullis, elected vice president, **Harris - Seybold Co.,** Cleveland.

Robert H. Vanderkay, elected vice president, **Webster Spring Co.,** Webster, Mass.

R. Edward Stein, elected vice president and general manager, Welding Div., **Lewis Welding and Engineering Corp.,** Bedford, O.; **Edward W. Hollis,** appointed general manager, Machine Div.

Per Ulf Gummeson, appointed vice president and general manager, **Hoeganaes Sponge Iron Corp.,** New York.

Julius H. Strassburger, appointed assistant vice president, engineering, **National Steel Corp.,** Pittsburgh.

Nelson E. Lewis, appointed plant superintendent, Niles plant, **American Welding and Manufacturing Co.,** Warren, O.

Francis H. Armbrust, appointed superintendent, Coke plant, Youngstown district, **Republic Steel Corp.,** Cleveland.

Leonard S. Ham, appointed superintendent, Hot Strip Dept., **Granite City Steel Co.,** Granite City, Ill.; **Clarence R. Mitchell,** named divisional superintendent, Rolling Mills; **Bert D. Houston,** appointed assistant superintendent, Hot Strip Dept.

H. K. INTEMANN, appointed executive vice president, Electro Metallurgical Co., New York.

GEORGE ENDICOTT, appointed executive vice president, Morgan Construction Co., Worcester, Mass.

W. G. SCHOLL, elected executive vice president, Allis-Chlamers Mfg. Co., Milwuakee.

BOYD S. OBERLINK, elected vice president, Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee.

V. J. Verhunce, appointed superintendent, manufacture, Central Div., **American Can Co.,** St. Louis; **C. E. Martin,** appointed assistant manager, manufacture, Chicago.

Dr. James K. Stanley, appointed supervisor, Silicon Steels and Magnetic Materials Research Section, **Crucible Steel Co. of America,** Pittsburgh.

William B. Towner, appointed general production manager, **Foote Mineral Co.,** Philadelphia.

Charles S. Mercer, named manager, Morgoil Bearing Dept., **Morgan Construction Co.,** Worcester, Mass.; **Norman A. Wilson,** appointed manager, Research Dept.; **Richard W. Young,** appointed assistant chief engineer; **E. Raymond Comtois,** appointed chief draftsman; **Andrew C. Marsters,** appointed proposal engineer.

William H. Boothe, appointed sales manager, Warehouse Div., Hamilton Steel Warehouse, **Jones & Laughlin Steel Corp.,** Cleveland; **John E. Ellis,** appointed manager, Indianapolis Warehouse.

J. R. Mann, appointed controller, **Clearing Machine Corp.,** Chicago.

Thomas J. Moore, Jr., appointed director, purchases, **La Salle Steel Co.,** Chicago.

Walter Rivers, appointed general manager, sales, Metal Container Div., **Southern States Iron Roofing Co.,** Birmingham, Ala.

A. Warren Everett, appointed assistant manager, sales, **National Gypsum Co.,** Birmingham, Ala.

Maurice H. McKinnon, appointed manager, **Perfect Circle Corp.,** Hagerstown, Ind.

ELMER B. DUNKAK, elected vice president, sales, Selas Corporation of America, Philadelphia.

J. LOUIS REYNOLDS, elected executive vice president, Reynolds Metals Co., New York.

WILLIAM B. ILKO, appointed administrative assistant, American Chain & Cable Co., Inc., New York.

M. J. TAUP, appointed administrative assistant to vice president, sales, Vickers, Inc., Detroit.

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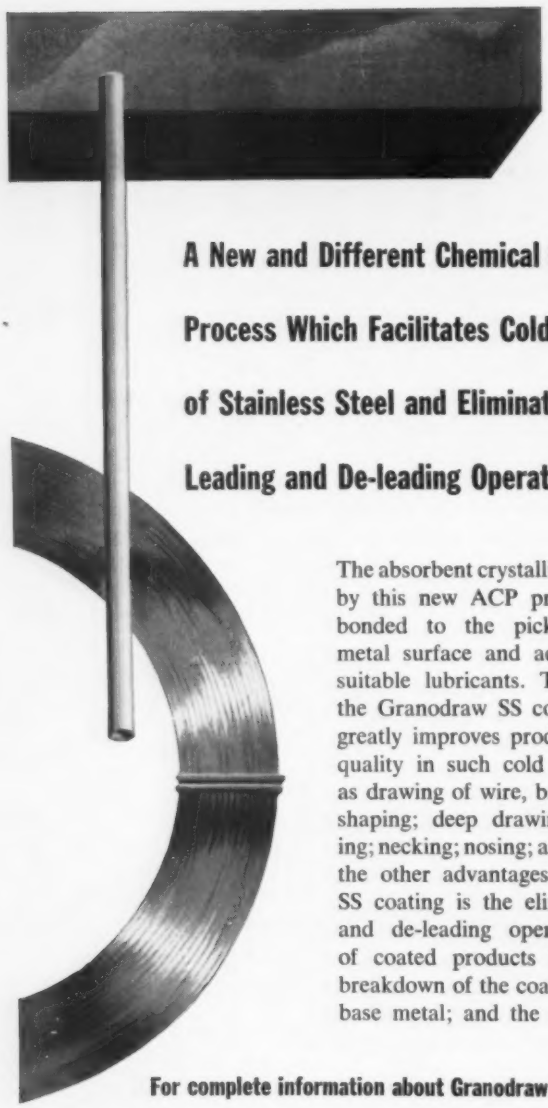

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Franklin Kane, appointed assistant supervisor, budget section, Accounting Dept., **Jones & Laughlin Steel Corp.,** Pittsburgh.

Eugene F. Erbin, appointed metallurgical sales engineer, **Titanium Metals Corp. of America,** New York.

John G. Lucas, Jr., appointed plant electrical engineer, **Pittsburgh Plate Glass Co.,** Pittsburgh.

Dr. Cledo Brunetti, appointed director, engineering, research and development, Mechanical Div., **General Mills, Inc.,** Minneapolis, Minn.; **Dr. Carl L. Kober,** appointed associate director, systems engineering, research and development, Mechanical Div.

Albert Stanley Fischer, appointed administrative assistant to director, research and development, **Kawneer Co.,** Niles, Mich.

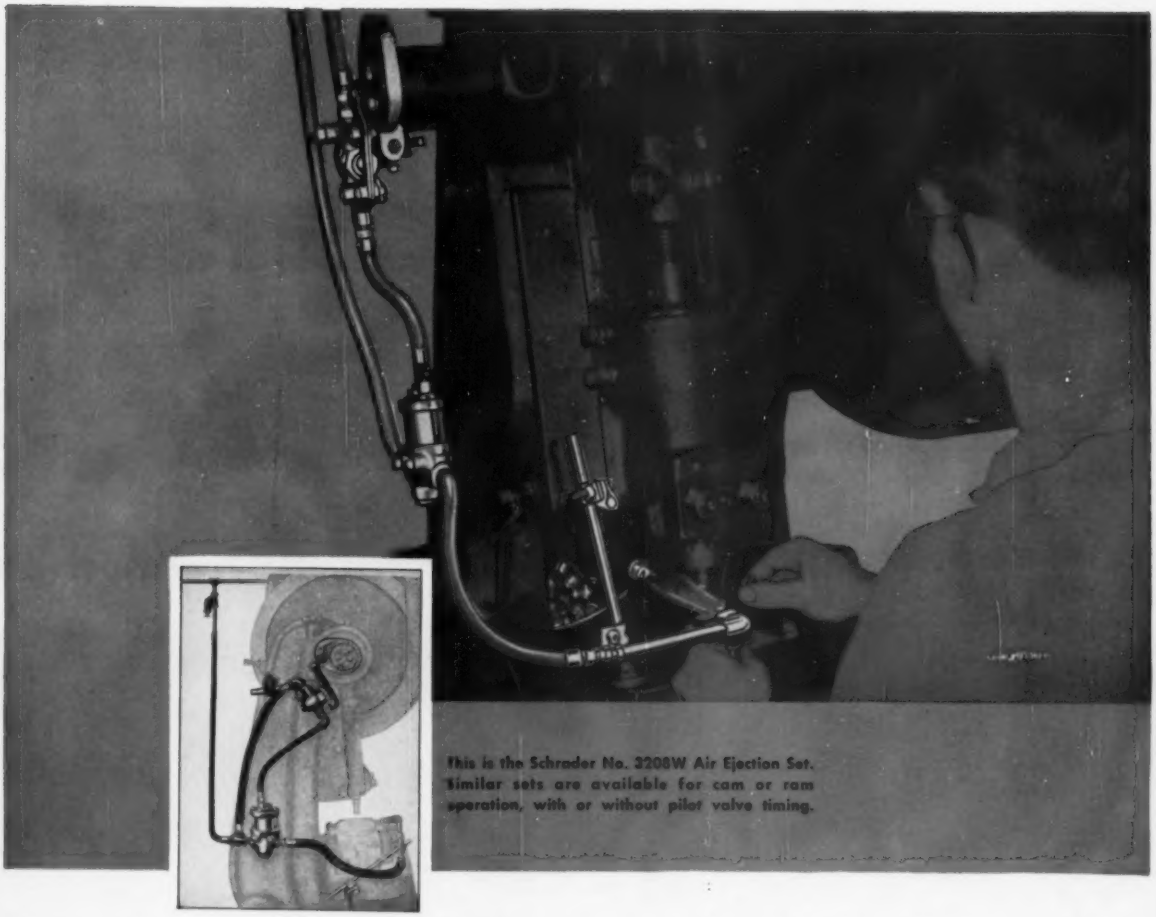
Charles T. Nichols, appointed sales representative, Chicago and Northern Illinois Steel Strapping Div., **The Stanley Works,** New Britain, Conn.

James W. Sibley, Jr., named superintendent, parts and service plant, Buick Motor Div., **General Motors Corp.,** Flint, Mich.

Newly named supervising engineers, **Allis-Chalmers Manufacturing Co.,** Milwaukee: **Robert Peebles,** mill control; **Allan Halter,** specialized control; **William Eagan,** regulators and circuit development; **George Brooks,** standard starters and engineering services; **Charles Peter,** device development; **Geert Beling,** development laboratories.

W. R. Wyckoff, named product manager, **Townsend Co.,** New Brighton, Pa.

R. Stanley Burt, Edward J. Schultz, Robert A. Murphy, and **Joseph M. Morin,** appointed abrasive grain specialists, The Electro Minerals Div., **The Carborundum Co.,** Niagara Falls, N. Y.



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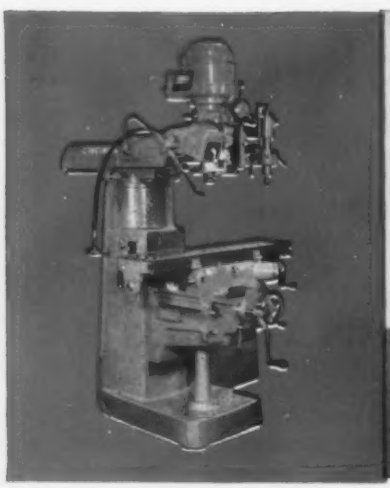

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have all the features and characteristics so desirable for low-cost die sinking operations. The table is manually controlled. For die sinking, vertical movements of the cutter head are automatically controlled through the Automatic Hydraulic Depth Unit. Table traverse, 16" or 22"; cross traverse, 10"; spindle drive, 1 hp. Want more information? Complete specifications may be obtained by writing for catalog No. M-1919.

New CINCINNATI Nos. 2ML and 2MI Milling Machines

New features which will reduce costs in your shop include auxiliary motor for feed drive (full hp of main drive motor transmitted to the spindle); cutting fluid pump now individually motor driven; filters relocated for easier accessibility. Automatic Table Cycles, available for Plain and Vertical Machines, include Automatic Backlash Eliminator. Automatic Spindle Stop available for Automatic Cycle Machines. For more details ask for publication No. M-1916.

New CINCINNATI Dial Type Milling Machines

are heavier and more powerful than ever before. All sizes (Nos. 2, 3, 4) are available in Plain, Universal and Vertical styles. All are equipped with Automatic Backlash Eliminator; motor driven cutting fluid pump; feed drive motor mounted on the knee; push-button spindle speed change and spindle start-stop. Plain and Vertical Machines are available with or without Automatic Table Feed Cycles. Catalog No. M-1915.

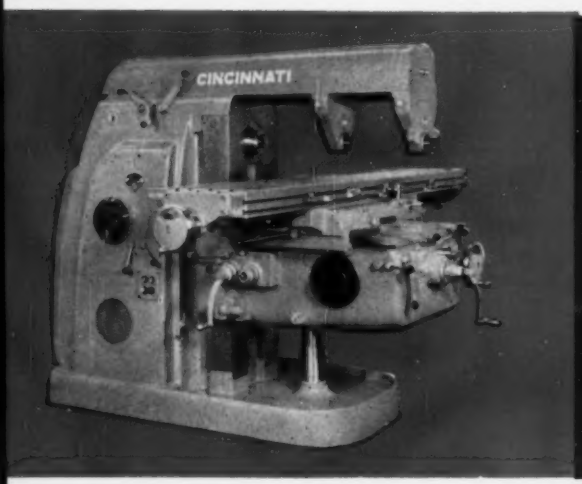
MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING

The forecast that concerns you most this year—cost of production in your shop—can be accurately determined by comparing your present metalworking equipment with the newest available. Take a long close look at your milling machines, for example, and compare them with new CINCINNATIS. You'll be agreeably surprised at the big savings you can make in cost of production . . . closer precision . . . reduced maintenance charges. Replace now with new CINCINNATI Milling Machines, and you can forecast a much better year for your business. ¶ Of course, Cincinnati builds many more standard milling machines than those illustrated here . . . actually 293 sizes, types and styles. And in addition, five cutter and toolroom grinders. For brief specifications look in the latest issue of Sweet's Machine Tool File, or write us for literature. No obligation.

'56

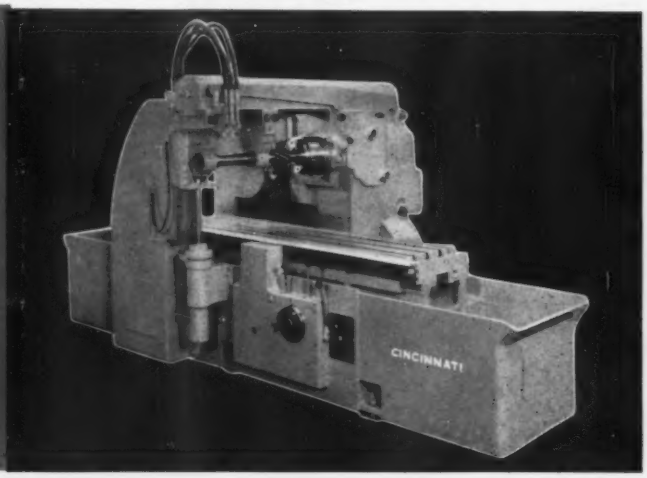
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

NEW Cincinnati Millers in your shop



New CINCINNATI High Power and Dual Power Dial Type Milling Machines

are unquestionably the heavyweight champions among knee-type milling machines. Now, the full power of the main drive motor (up to 50 hp) is transmitted to the spindle; a 5 hp motor takes care of feed and rapid traverse requirements. One lever selects 24 spindle speeds and 32 feeds; one lever engages table feed and rapid traverse; a small lever on the knee engages the spindle clutch; Dynapoise overarm smooths out the cutting action; automatic backlash eliminator on table feed screw included with standard equipment. Built in Nos. 3, 4, 5 and 6 sizes. More information in catalog No. M-1917.



New CINCINNATI Tracer Controlled HyPowermatic Milling Machines

are built in Plain and Duplex styles and 42 sizes of each from 36" to 168" table traverse; up to 50 hp spindle drive and separate 5 hp feed drive. They combine heavy duty tracer controlled milling with all the conventional milling operations assignable to Plain and Duplex HyPowermatics. Simple sheet metal templates are attached to the fixture or table. Profiles having curvatures and straight lines at angles up to 80° from the horizontal can be accurately milled. Want complete specs? Ask for catalog No. M-1909.

CINCINNATI

MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

CURTISS-WRIGHT METALS PROCESSING DIVISION CAN COMBINE QUALITY WITH ECONOMY IN YOUR PRODUCTION TOO!

This nickel alloy casting by the Curtiss-Wright Metals Processing Division costs 40% less than identical previous castings. The saving, however, is almost a sidelight to the fact that specialized know-how can discover routes to quality that are often far shorter as well as less expensive.

High Standards, Lower Cost

In this case the answer to meeting high standards and lower cost was ceramic mold instead of investment casting. This method in experienced hands retained the close tolerances required . . . produced castings faster, and with gratifying economy.

Metals Processing Division metallurgical specialists can find answers for you, whether in ceramic, shell, centrifugal or other techniques . . . standard or special. You will profit by long-proven engineering ability and unmatched facilities in production and testing. When requirements are critical, when precision must be combined with resistance to heat, stress, wear and corrosion, it's time to call on Curtiss-Wright—a primary source for castings, forgings and extrusions.

METALS PROCESSING DIVISION
CURTISS-WRIGHT
CORPORATION · BUFFALO, NEW YORK

72 Grider Street, Buffalo, New York

Courtesy National Research Corp.

DEGASSING 150 tons of steel for a top quality forging ingot in plant of Bochumer Verein AG.

FEATURE ARTICLES

No-pressure economics—

Why Is The Big Money Behind Vacuum Metals?

◆ Whether you produce metals or fabricate them, you'll want to keep tabs on vacuum metallurgy . . . Are vacuum-processed alloys so much better than regular grades? . . . Who melts these materials? . . . Who makes the equipment? . . . What's the difference between vacuum melting and vacuum degassing? . . . Here are the answers to bring you right up-to-date.

By P. M. UNTERWEISER, Metallurgical Editor

◆ VACUUM METALLURGY has been facetiously defined as another aspect of metalmaking you hire a metallurgist to worry about. Don't *you* believe it. If you're in the metalworking industry, progress in vacuum metallurgy should be a starred item on your list of current interests—and for a very businesslike reason.

A doctor's degree in metallurgy is certainly not prerequisite to sizing up the dollars-and-cents importance of the current vacuum metals trend. Basically, it has to do with metal quality. And—sooner or later—quality is everybody's business.

The makers of specialty steels, large forgings, and certain critical nonferrous metals are now—and will continue to be—very much aware of the trend. They have already made a considerable financial contribution for development, research, and a variety of basic experimental and production equipment. Such investments are calculated to increase over a 10-year period.

For these producers, the timing of the new development and its attendant expense are less than ideal. At a time when steel demand far exceeds supply, this additional expense could cut heavily into much needed expansion and equipment replacement.

Vacuum metallurgy seems to have gotten

Courtesy National Research Corp.

HIGH vacuum system of mechanical "gas ballast" pumps will degas 10 tons of steel per minute.

ahead of itself, exceeded what probably would have been its normal rate of progress. It introduces remarkable improvements in steelmaking: lower gas content, freedom from inclusions, and greater strength. But for some it is ill-timed and — what's worse — downright embarrassing.

Remember that before the publicity on vacuum metals began its rounds, few people were aware that the steels they had been buying suffered from so many disadvantages. The heralding of vacuum metals obviously let escape a lot more than just gas.

In terms of adverse publicity, a major dilemma was custom built for most of the industry.

But behind the publicity, there remained an ironic twist. American steels weren't in sorry shape and never had been. Quality-wise, they were, and still are, as fine as present-day technology can make them. This was common knowledge to millions of steel users.

Even the weight of precedent couldn't alter the fact that the story of gas-free, inclusion-free, trouble-free steel had already been released. To a greater or lesser extent, the seeds of doubt had been sown.

The pressures of ordnance were also a factor. The Air Force continued to harp on the fact that blading materials were less than perfect, were seriously limiting air progress. And the Navy sounded off about its sad materials' experience in building the *Nautilus*.

Not least important were the dramatic, in-service failures of a number of large, turbine-rotor forgings. Failure analysts — with only partial justification — were consistent in attributing failure to "entrapped hydrogen."

As the dilemma approached its peak, steelmakers took another—and much more serious—look at the vacuum processing situation. There being no way to beat it, they quickly decided to join it. So that today, without exception, every major alloy steel producer is either dabbling in, or playing to the hilt, the business of vacuum metallurgy.

Before the current surge, early interest was largely restricted to vacuum melting. As a

VACUUM METALLURGY
is Staking Claims in These Industries

Aircraft

Automotive

Electronics

Ball and Roller Bearings

Tool and Specialty Steels

Nuclear Energy

process, this involves heating metal under vacuum to the fluid state by means of electrical arc, resistance, or induction.

Vacuum must be sufficient to protect the molten metal from reaction with atmospheric gases, to dissociate gas-metal compounds, and to remove dissolved gases from the system. Even melt additions are normally made under vacuum conditions to insure a minimum of contamination and metal loss due to oxidation.

In this field, four or five pioneers were responsible for getting the ball rolling. General Electric, National Research, Universal Cyclops, and Utica Drop Forge were among the earlier commercial experimenters in the U. S. At about the same time, programs were being sponsored by the Atomic Energy Commission and a handful of academic research groups.

For a while, there followed a period of sniffing about—technically known as "surveying the situation." A few technical articles were published, and all were enthusiastic. Requests to visit the pioneer installations began to trickle in from all sides. Committees were formed, discussion groups organized, conferences scheduled. Interest was definitely on the upswing.

And then, to quote an equipment maker, "came the herd." It was the sort of stampede an equipment salesman might dream about in his weak moments.

Queries, bids, and orders for new equipment came quickly and in just that order. They came so thick and fast that even the chronology of events became hopelessly scrambled. To this day, it is almost impossible to tell just who entered the picture in sixth, tenth, or twenty-fourth place.

With the ever-rising tide of interest, the vacuum equipment producers' major problem has been trying to keep from being snowed under with new orders. Among the leaders, Consolidated Vacuum Corp., National Research Corp., and the F. J. Stokes Machine Co. are profitably sharing this same problem.

All three are suppliers of production vacuum furnaces for industry. They are equipped to design and build a variety of basic furnace installations, ranging from laboratory units to 1000 lb capacity and higher. Each company maintains a large engineering staff to handle the special modifications demanded by particular industrial requirements.

Installations are growing

A number of outstanding vacuum melting installations can be claimed by each of the leading equipment suppliers. To name a few, both Carboloy and Westinghouse are operating large production units built by Consolidated Vacuum. National Research takes credit for the vacuum unit with 2200 lb capacity recently brought into production at Vacuum Metals Corp. Another National asset is its recent acquisition of U. S. licensing rights to the metal degassing processes developed by Bochumer Verein of West Germany. Stokes is responsible for pioneering installations at Utica Drop Forge and Universal Cyclops.

The list of known installations is so lengthy (and still growing), we've shunted it over to a special box on Page 70. Names of certain producers of forgings (U. S. Steel, Bethlehem, Midvale, Erie) have not been listed, although late reports indicated that these companies were still weighing the pros and cons. By now, all may well be committed to the purchase of equipment.

Allegheny Ludlum has not only entered the vacuum metals picture, but has already sponsored the development of a less conventional technique (THE IRON AGE, Oct. 27). It consists of making cast electrodes of an alloyed, predetermined composition from a production

So You're In The Business

▪ If you are in the steelmaking business and interested in what your competition is up to, chances are you're following vacuum metallurgy from every angle. Chances are, too, that this newly acquired interest is costing you money — plenty of money. As industrial hobbies go, vacuum metallurgy isn't cheap.

You didn't ask for it, certainly. Neither did your principal competitor. Even your research boys may have been a little late in calling the shots.

Your engineers began to froth with enthusiasm spilled over a series of memos, technical reports. The digging for the latest dope became deeper and more frantic. Memos crossing your desk began to carry references to even *Stahl und Eisen*. You were pretty sure your chief engineer hadn't cracked a copy of *that* since he wrote his last college theme.

And, being human, you began to wonder. The question that really bothered you the most after "how much?" was "how come?"

size, electric furnace air melt. These electrodes are then remelted under vacuum by arc melting in a watercooled, copper crucible.

So far the process has been used to melt more than 300,000 lb of alloy and seems to fit neatly into the production picture. It is promising enough to justify plans to produce 5000-lb ingots in the very near future.

All of this activity certainly underlines the economic importance of vacuum metallurgy, confirms a general trend in specialty steel production for years to come. But what, exactly, is its significance from the technical standpoint?

Realistically, the mere mention of "vacuum" in connection with melting or pouring practice means very little. In some instances, it means nothing. For it is the *degree* of vacuum and the *effectiveness* of the degassing technique that are meaningful.

With this in mind, it is obvious that vacuum techniques derive their success or failure primarily as a function of equipment technology. Metallurgy enters the picture only *after* success or failure of the process has been established.

A down-to-earth equipment engineer recently stressed the fact that vacuum melting "is not a panacea." The vacuum furnace, regardless of its design, still differs basically from conventional equipment mostly in regard to its operating pressure. It can be heated by induction, arc, or electrical resistance. But the same old heating principles still apply. And careful melting practice is still a prerequisite with or without vacuum.

One extremely important factor has been rather consistently overlooked. It is the vapor pressures of the various metallic elements. The vapor pressures at melt temperature of the ele-

Courtesy General Electric Co.

OPERATOR aligning a conveyor inside a Consolidated Vacuum furnace to make late additions.

Who's Doing Vacuum Melting?

Partial List of Firms with Vacuum Equipment

Allegheny Ludlum Steel Corp.
American Steel & Wire Div., U. S. Steel Corp.
Austenal Laboratories, Inc.
Bulova Watch Co.
Carbide & Carbon Chemical Co.
Carboloy Dept., General Electric Co.
Chrysler Corp.
Climax Molybdenum Co.
Crucible Steel Co. of America
Dow Chemical Co.
Driver-Harris Co.
E. I. duPont deNemours & Co., Inc.
Electro Metallurgical Co.
Ford Motor Co.
General Electric Co.
General Motors Corp.
Goodyear Tire & Rubber Co.
Haynes Stellite Co.
Hoskins Mfg. Co.
Howard Foundry Co.
International Nickel Co., Inc.
Glenn L. Martin Co.
Minneapolis Honeywell Regulator Co.
National Lead Co.
Pratt & Whitney Aircraft
Radio Corp. of America
Remington Arms Co., Inc.
Thompson Products, Inc.
Universal Cyclops Steel Corp.
Utica Drop Forge & Tool Corp.
Vacuum Metals Corp.
Vanadium Corp. of America
Westinghouse Electric Corp.

ments which make up a particular alloy can either limit or enhance the usefulness of vacuum techniques.

When the vapor pressure of a metallic element is low, an important advantage is realized. Oxides of the element decompose at the melting point of the metal, and the released oxygen is pumped away. For this reason nickel alloys can be made under vacuum with practically no slag.

But suppose the vapor pressure of the element is extremely high, as is the case with manganese. Then the problem becomes one of trying to keep the element itself in the melt.

Since both conventional and non-conventional melting techniques have been covered, let's examine still another vacuum technique—metal degassing. The most widely heralded degassing technique is the so-called Bochumer process, developed by Bochumer Verein, A. G. Its procedures were both described and illustrated by means of motion pictures by Drs. Bandel and Couppette of Gusstahlwerke Bochumer at the AIME Electric Furnace Steel Conference held in Pittsburgh, Dec. 8.

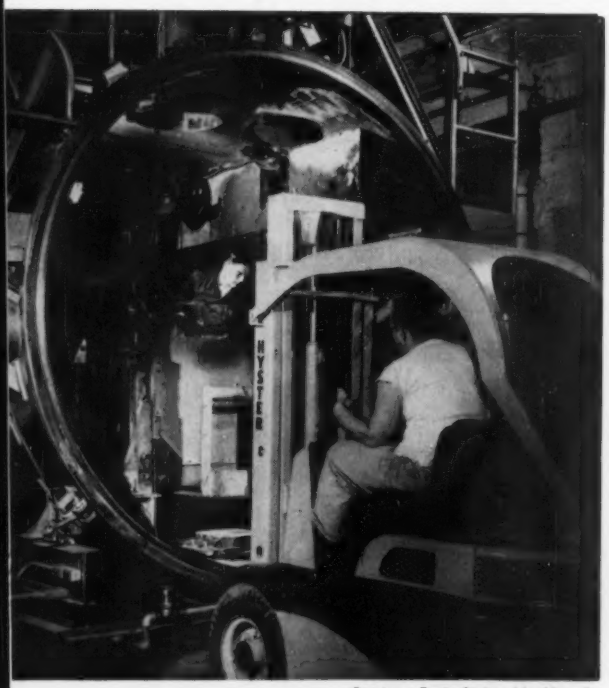
Actually, Bochumer offers three distinct degassing techniques. Least effective would seem to be ladle degassing. In this process, a standard tapping ladle containing liquid steel and a slag cover is evacuated in a vacuum-tight container. The effect of the vacuum is, of course, largely limited to the slag surface. The technique is further hindered by the effects of ferrostatic pressure.

To avoid these shortcomings, Bochumer devised two additional techniques, both of which stem from the same principle. One is known as stream-droplet degassing. This process starts with an empty ladle placed in a carefully evacuated container. A special tapping ladle is positioned on top of the evacuated container, forming a tight seal. Fluid steel pours from the tapping ladle into the evacuated chamber in a controllable stream of individual droplets. Degassing occurs as the droplets fall to the receiving casting ladle.

Droplets fed to mold

Vacuum-ingot casting is an almost identical process, except that the droplet stream is fed to an ingot mold instead of a receiving ladle in the evacuating chamber. The resulting ingot, after cooling, represents the end product. The steel in the casting ladle is subsequently removed from the vacuum chamber while still in the fluid state and is poured in air.

Both techniques have the same major advantages: (1) Since individual droplets are each exposed to the vacuum, degassing rates and volumes are extremely high; (2) using



Courtesy F. J. Stokes Machine Co.

REMOVING a 1000-lb crucible and coil assembly from furnace after disconnecting water lines.

Vacuum Melting vs Vacuum Degassing

Vacuum Melting:

1. **Degasses metal *during* the melting cycle.**
2. **Permits additions to the melt during melting cycle and protects such additions from oxidation and other forms of gas contamination.**

Vacuum Degassing:

1. **Removes entrapped gases from liquid metal *after* the melting cycle.**
2. **Can be achieved by:**
   a. **Placing pouring ladle in vacuum chamber.**
   b. **Pouring to a receiving ladle within a vacuum chamber.**
   c. **Pouring directly into an ingot or other mold within a vacuum chamber.**

"Test results on degassed ingots and forgings show reduced flaking on Ni-Cr-Mo steels . . ."

either a casting ladle or an ingot mold, single heats can be handled up to 150 tons.

This latter advantage is probably most significant at present, since vacuum melting facilities have not been developed to handle comparable tonnage in a single heat. Vacuum casting of high tonnage ingot is of particular interest to the manufacturers of large forgings.

But ingot size is not the only advantage claimed for the process. Because there is no oxidation within the vacuum chamber, metal splash on the ingot mold walls is no longer significant. Mold coatings are entirely eliminated. And mold life is considerably extended. Pouring speeds can be increased or decreased without fear of oxide inclusion contamination.

Breakdown of gas volumes evacuated during the vacuum pouring of a 25 ton ingot of chrome-moly steel is as follows: 40 pct CO, 4 pct CO_2, 23 pct H_2, and 33 pct N_2. As a rule, the volumes of oxygen and nitrogen drawn off vary directly with carbon content. To a lesser degree, this same rule seems to apply to hydrogen.

As might be expected, traces of vaporized metals are drawn off along with the gases. The metals, all of high vapor pressure, include manganese, copper, and tin.

Evacuating the fluid steel droplets has no effect on carbon segregation in the melt. In this one respect, melt results are about comparable to those obtained by conventional methods.

Reduce flaking

Test results on degassed ingots and forgings (up to 100 tons) show that the vacuum ingot process seems to have either greatly reduced, or entirely eliminated, flaking on the Ni-Cr-Mo steels tested.

Remember this very important point: all of the steels tested were German grades and differed from standard U. S. analyses. Because the chemistry of some of these grades renders them less susceptible to the effects of hydrogen, results on U. S. grades still have to be determined.

In another experiment, 2-ton ingots were rolled into rails. Half were pit cooled and the remainder were cooled in the air. Of the rails made from degassed ingot and cooled in air, only 5 pct showed signs of flaking. But even with this small percentage, flaking could not definitely be attributed to gas entrapment. Equally important factors were cooling, hot-working, and transformation stresses.

Latest Bochumer mechanical test results for degassed steel were derived from a Ni-Cr-Mo melt heat treated to a tensile strength of about 80,000 psi. While the exact analysis was not given, it was indicated that the steel was a low-alloy, high-strength type.

Compared to conventional heats, the degassed steel showed improvement in both elongation and reduction of area. Elongation rose from 20 to 32 pct. Reduction jumped from 25 to 40 pct. Impact strength was not measurably affected.

How do these values compare with test results on the vacuum melted steels? Forgetting compositions for the moment, the magnitude of improvement in mechanical properties is pretty much the same for both techniques. The one striking difference centers about impact values. Vacuum melted steel results have consistently indicated improved impact properties.

Test results scattered

But the sum total of available test results—German and American—is painfully slight, and it is scattered over a variety of alloys. It is obviously not safe to compare jet engine blading materials with AISI 52100, 4340, or other low alloy steels. It is even more hazardous to compare these alloys, in turn, with the less familiar German grades.

Each steel producer has his own particular quality problems and will doubtless organize his immediate research accordingly. More conclusive evaluations will have to wait until more of these results are made known.

At present, it appears that most of the more highly specialized aircraft materials will continue to veer toward vacuum melting. The fact that many of these materials are normally produced on a low tonnage basis makes them readily adaptable to vacuum melting facilities.

Vacuum degassing, on the other hand, is more likely to catch hold where higher tonnages are involved. As a case in point, the production of massive ingots for extremely large forgings seems a natural.

WANT A COMPLETE BIBLIOGRAPHY?

If you're looking for more information on vacuum melting then you'll want a copy of this bibliography being offered free to our readers.

Prepared by T. J. Kopkin, Technical Librarian of the U. S. Naval Gun Factory, with the assistance of Vincent DePierre, Foundry Metallurgist, it contains over 160 references on the subject. Covering the period 1945-1955, the bibliography is broken down by sections into metals behavior, ferrous and nonferrous metals, furnaces and accessories, etc.

A limited number of copies may be obtained by writing to Readers' Service Dept., The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

Get better color match—

Assemble First For Lower Painting Costs

By HERBERT CHASE, Consultant, Forest Hills, N. Y.

◆ Spraying auto bodies on one line, and such components as front ends, fenders and trunk lids on other lines, has been common industry practice . . . Difficulties were in getting precise color matching and avoiding marring of finishes during subsequent assembly.

◆ By first assembling, then painting the body as a unit, Chrysler has gained several benefits . . . Multiple painting setups have been eliminated; handling and finishing costs reduced . . . Finishing operations are almost entirely automatic.

◆ COMMON practice in finishing passenger car bodies in automotive plants has been to make and finish front ends, fenders and rear decks separately from the body proper. One major producer has discovered there are marked advantages to first assembling, then painting body and components as one unit.

Chrysler Div. introduced the inverted practice in its recently completed $20-million Detroit body plant. Several advantages are realized with the turnabout finishing method. These include:

Space savings: Separate space is no longer needed for painting, baking and related operations on the separate components.

Reduced handling and repairs: Before, handling of separate prefinished parts inevitably resulted in a large number of scratches or other damage. This meant expensive repair operations on the parts. Reduced handling after finishing has greatly decreased this repair operation. Total savings in space and labor, as well as in avoiding duplication of equipment, are proving important.

Automatic color matching: With the new method, the entire body assembly travels down the same spray lines and receives paint from the same batches. This gives precise, automatic matching.

Here's the new Chrysler Div. sequence: Steel body shells, readied for painting, are first

AUTOMATIC SPRAYING EQUIPMENT in this booth applies about 95 pct of all exterior priming to these Chrysler bodies. Remaining exterior, all interior portions are hand-sprayed.

OPERATOR HANDSPRAYS undersurfaces from this pit near end of priming booth. Note sturdy mounting skids which carry, protect bodies.

mounted and bolted to sturdy skids. Fenders, front ends and rear decks are applied to bodies before finishing starts, and the skids make the assembly as stiff as if it were on the chassis frame.

Once fastened to a skid, the body remains, including attachments normally added later, until ready for transfer to a chassis. All handling of loaded skids is done by conveyors, mostly dual chains either at floor level or elevated.

Loaded skids generally advance longitudinally, and always so in passing booths and ovens. Some transfers are made transversely though. This makes switching points necessary, but at these, as elsewhere, motions are automatic and there are automatic interlocks. These prevent jamming by stopping the conveyor or transfer device as required. Manual effort is not needed at transfer or other points, since virtually all motions are automated. Some, but not all, processing is also automated.

Spray Bonderizing Sequence

Before any finish coats can be applied, surfaces to receive them must be smooth and clean. Proper protection against rust and provision for good adherence are obtained by automatic spray Bonderizing. This is done in a Peters-Dalton tunnel, in seven stages: a preclean in water at 170°F for 30 seconds; Parco emulsion cleaning at 170°F for 60 seconds; two 30-second rinses in water at 160°F; spray Bonderizing for 60 seconds at 135°F; a cold water rinse for 30 seconds; Parcolene treatment for 30 seconds at 170°F, air blow off; and a 5.6 minute dry off in an oven at 350°F.

Equipment includes means for gas heating and checking the solutions. These are kept up to specifications by additions as needed. Otherwise, this operation is completely automatic.

To insure proper drying before the finish is applied, bodies are blown off by hand-controlled air jets, chiefly to keep water out of recesses. Then bodies pass through a gas fired oven to evaporate all remaining moisture. After moving through a cooling tunnel, bodies receive a naphtha wipe, then enter the primer spray booth. In this, as in subsequent Peters-Dalton spray booths, there is a down-draft of clean filtered air. This is drawn, along with overspray, through floor openings covered by a very slowly moving grille, like steel belts above trenches through which water flows to collect the overspray. Men doing hand spraying stand and walk on the grille belts at each side.

A noteworthy feature of the primer spray booth is the use of automatic spraying units. These apply about 95 pct of the primer and surfacer to the top and side exterior surfaces.

One Binks sprayer contains four guns, each mounted on a frame so arranged that it rocks fore and aft above the body. Of the four guns in this unit, two above the body are oscillated from side to side and one at each side is rocked up and down through an arc that curves around the body sides. These four guns cover most of the top and outer side surfaces and also apply some primer on front and rear. Coverage on these latter is not complete though, and is supplemented by later handgun spraying.

Electric eye controls

In all automatic spraying, there are automatic controls actuated by electric eyes in such a manner that spraying continues only when bodies are in proper spraying position. Air is shut off and spraying ceases when gaps between bodies pass through spray areas. Otherwise there would be much waste of primer and it would deposit on surfaces where it is not wanted.

Other units of Schweitzer design are used only when the Binks automatic units have to be shut down for servicing operations.

Bodies then continue on through areas where spraying is done manually, chiefly on surfaces not reached or insufficiently covered by the automatic sprays.

Automatic sprays reach chiefly side and top exteriors. Those front and rear and interior surfaces receive little or none of the automatic spray. Consequently, spray-men open doors, hoods, and decks. After the first primer coat is completed, a second and third coat are applied, in automatic and hand spraying areas where processing and equipment substantially duplicate that already described.

Primer is not applied to the under surfaces of the body or fenders, but these surfaces are well coated later by a gray Ecoshene finish which includes solids recovered in other painting. This coating is done as bodies pass over the pit near the end of the primer booth. Hand spraying is

then done to reach all under surfaces including the floor pan and surfaces below fenders.

Bodies leaving the primer spray booth enter the B & S Fabricators gas fired baking oven. Here they are subjected to direct heat and remain 35.6 minutes, mostly at a temperature of 300°F. This completely oxidizes the hard bake oil-type coats, making them enduring and well suited for subsequent coats.

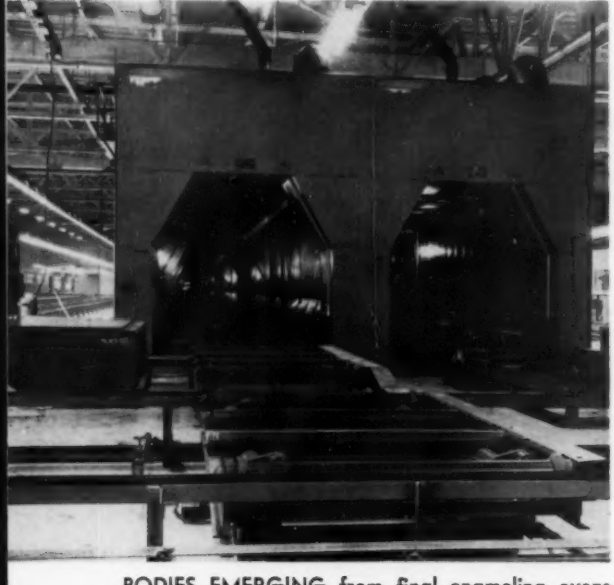
After some cooling and before sanding, bodies go through conveyor lines on which joints, including those where fenders join the body, are sealed. This is done with a compound applied by a small low pressure gun, followed by a small brush. Dumdum is also applied at inside joints not seen in service and some minor sealing operations are performed. After this, a silencer compound is applied to top and bottom faces of the floor to prevent drumming noise.

Wet sanding follows

Bodies then pass in two parallel lines through short tunnel ovens supplied with indirect gas heat, and emerge into a wet sanding department. There, they are water-spray cooled to convenient working temperature. Most sanding is done by hand, some hand controlled air sanders being used. Purpose is to produce a smooth surface that will take glossy finishing coats and show a minimum of surface irregularities. Much manual labor is required in this wet sanding but no better means has been found to attain the high finishing quality required.

Next operation is to put bodies through short ovens for four minutes at 325°F to dry any water remaining from sanding. Bodies go through a cooling tunnel next, then enter parallel spray booths for a coat of gray Ecoshene applied to all surfaces (chiefly exterior) that are to receive colored finishing coats later. This spraying helps give depth to subsequent coats. It is applied in the same manner as the primer coats.

Most interior surfaces are later covered by upholstery or other trim, so there is no need to respray them. Those that do remain exposed are sprayed by hand. Some hand spraying, especially of door edges, that will not receive finishing coats is done with color coats of Ecoshene enamel that matches or harmonizes with subsequent color coats. Bodies then enter parallel drying ovens and issue onto lines on which hand filling and dry sanding are done to improve appearance of the color coats that follow. This sanding is followed by a tack rag wipe.



BODIES EMERGING from final enameling ovens are shifted transversely onto inspection, polishing lines, shown paralleling ovens at left.

Final coats hand sprayed

All of the two final coatings are sprayed by hand. This is partly because there are so many color options and variations that automatic setups would not be feasible.

Spraying of the first color coat is on the lower body for two-tone jobs and on the whole body for solid colors. Baking is then done for 25 minutes at 250°F in the tunnel ovens, and is followed by cooling in tunnels and by light dry sanding.

In the large majority of bodies, two or even three tones or separate colors are needed. The lower body then receives its color coat first. After sanding, naphtha wipe and tack off, the lower body is masked with tape and paper, so that the upper body can be sprayed by hand in the final paint booth. Solid color jobs are similarly processed except that no masking is required. After spraying the upper part on two-tone jobs, masking is removed and the bodies enter the final oven for 37.1 minute baking at 250°F. When they leave this oven bodies are inspected, then passed onto lines along which polishing is done with soft rotary wool buffs guided by hand. This completes finishing operations.

Some reworking necessary

As on all automobile production painting lines, finishes on some bodies have imperfections and necessitate reworking. So it is necessary to have repair lines onto which these bodies are shifted. Along these lines, imperfections are rubbed out. Afterward bodies are again passed through spray booths and drying ovens.

Respraying not only covers the repaired areas but often the whole exterior except the underside, and the repaired body has the same fine appearance as one requiring no repairs. In fact, the extra coats make it even better than bodies needing no repairs.

After finishing, bodies receive bright moldings and interior trim, hardware, etc., and are virtually completed before being removed from skids and mounted on chassis. It is not necessary, as on most final car assembly lines, to attach front ends, fenders, hood and decks, since these are already built onto the body.

Variation within 15 pct—

Torsion Bars Control Torque in Nut Running Tools

◆ Do you want close, repetitive torque control in a high speed nut running tool? . . . These new ones use adjustable torsion bars to hold torque within a 15 pct total variation or 7½ pct from that desired.

◆ Tools work at full speed and power, shut themselves off when preset torque is reached . . . Large model for steel construction, other heavy work has a 320 to 550 ft lb range . . . Smaller unit can be adjusted up to 90 ft lb.

◆ SPEED AND ACCURATE torque control make an ideal combination for many nut running jobs. Quite often, however, desired speed can be gained only at the expense of required torque control, or vice versa.

To solve this problem, Ingersoll-Rand Co. has applied the torsion bar principle for controlling torque in its line of air-driven nut running tools.

Numerous production-performance tests prove that nuts can be run consistently with not more than a 10 to 15 pct total variation or 7½ pct from a certain mean torque value. Moreover, this consistency can be achieved with full-power, full-speed operation. When the tool reaches its preset torque limit, it shuts itself off automatically.

Action of the control mechanism can be likened to that of a pogo stick, which bounces uniformly on slightly yielding ground, but rebounds higher when it suddenly strikes a hard surface.

In a similar manner, the new Impactool operates at normal power and speed while it is running a nut to the required torque limit. When this limit is reached, and the nut running resistance is equal to the stress preset in the torsion bar, the impact mechanism rebounds instantly. This trips a foolproof shutoff valve to stop the tool. Releasing the tool trigger then resets it for the next operation.

Setting the torque control limit is done easily with the use of a jig. It turns the torsion bar and calibration collar to the desired reading against rigid splines on the torque bar adjusting sleeve. This takes only a few seconds.

Once set, the torque limit remains constant for any given nut running operation. Releasing the trigger merely resets the tool automatically to the same torque.

Because the tool operates at full power and speed, there is no need for auxiliary pressure regulators. Another feature of the tool is reversibility, so that full power can be applied in either direction. Operators need have no fear about running the tool "wide open."

With no clutch to wear, slip, or require frequent lubrication or adjustments, a minimum amount of maintenance time and expense will keep the tool fully operable. The automatic shut-off eliminates the possibility of harmful over-torquing.

Belief of the manufacturer is that the steel construction field is one of several important areas where use of the new tool will save time and money. High strength bolts are presently being used to erect an estimated 25 pct of fabricated steel structures. This percentage is

Above: **RUNNING nuts on 7/8 in. bolts to tighten this truss. Minimum torque limit is 470 ft lb.**

Left: **SMALL tool tightens 1/2 in. bolts to 30 ft lb torque in fastening check valve cover plates.**

expected to increase sharply as additional cities modify their building code regulations to accept this technique.

One model of the new tool is designed specifically for erecting steel structures with the most commonly used 3/4 and 7/8-in. high strength bolts. In place of a four-man riveting team, the torque-controlled tool requires only two men to do a fast, efficient job. One man handles the nut-running equipment and the other holds the bolt in place.

Similar types used

Other types of nut-running tools have long been used in erecting fabricated steel structures. But to insure that they will perform to minimum torque standards, special stress checking and measuring devices are usually required.

Customary procedure is to check both the bolting-up tools and operators on the job site each day by having operators run a series of bolts in the test unit. This makes certain that the tool is capable of tightening nuts to the required torque. It also gives each operator a chance to estimate the time he must run each nut to reach the proper torque range.

However, the actual nut running conditions frequently vary from the test conditions, so that the operator's judgment of running time is really the key factor.

With the new torsion bar tool no special operator training or judgment is necessary. Furthermore there is no need for test equipment to check for proper tension.

The tool designed for steel construction work, and for heavy bolting-up in general industry, weighs 31½ lb. The torque control setting made at the factory is 320 ft lb, but this can be adjusted through a range of 14 calibrations to a 550-ft lb maximum. Free speed of the tool is 700 rpm. Average working speed is 635 rpm, delivering about 1270 impact strokes per minute.

Still another model, weighing only 6½ lb and more easily handled, is designed for utility nut running on bolts to 5/8-in. size. Torque control on this tool can be adjusted to a maximum of 90 ft lb. Only 10½ in. long, the unit has an average working speed of 1050 rpm, delivering 2100 impact strokes per minute.

The manufacturer expects that these smaller tools will be especially valuable as production aids in the automotive, appliance and machinery industries; and for maintenance work in steel, petroleum and chemical plants. All of these industries have many bolting-up jobs that require careful torque control.

Cut material waste—

◆ Squeezing maximum dollar value out of high-priced raw materials, such as titanium sheet, takes more than design competence . . . One goal is best use of the material's range of physical properties . . . But component design must also reflect manufacturing methods resulting in minimum waste of time, labor and material.

◆ Unless a specific plan directs your design approach, force of habit can dictate blind acceptance of a prominent fabrication method economically unsuited to the part or material . . . Encouraging creative engineering can help boost utilization without sacrificing product quality.

How To Design For Top Fabricating Economy

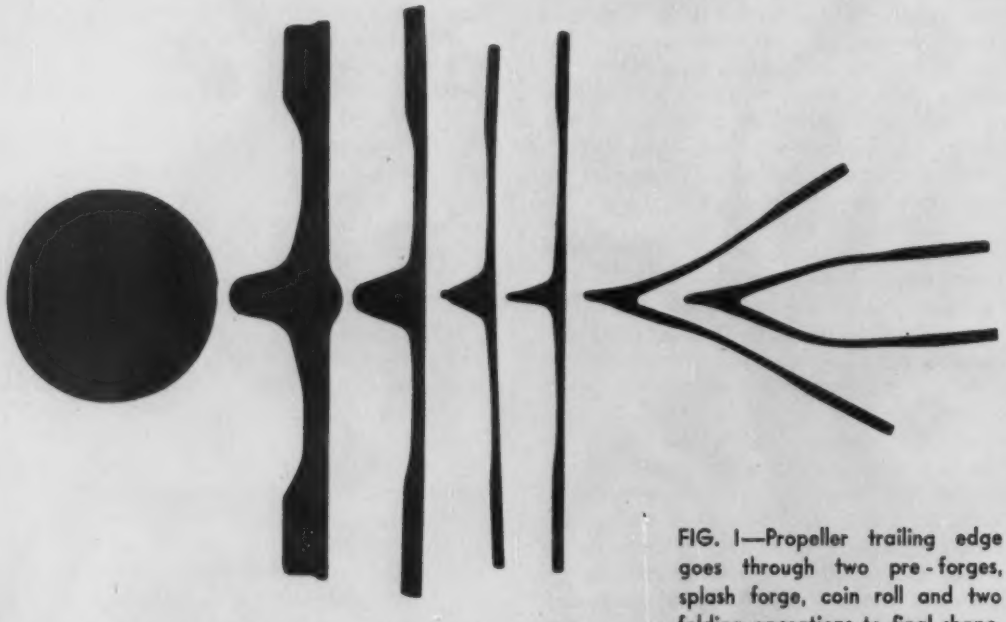


FIG. 1—Propeller trailing edge goes through two pre-forges, splash forge, coin roll and two folding operations to final shape.

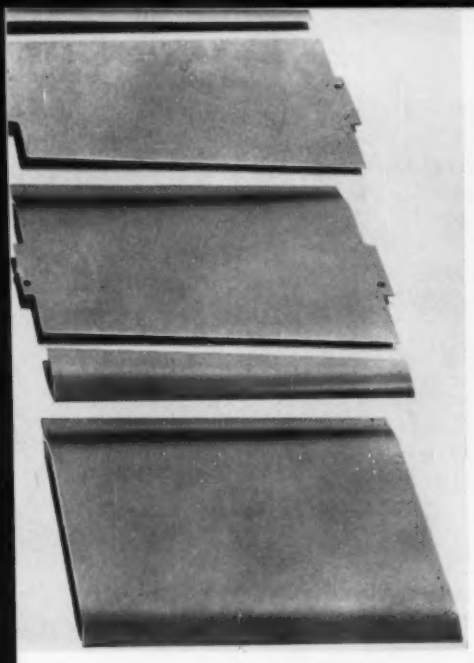


FIG. 2—Central propeller section is formed by flash welding center plates to both leading and trailing edges. More than 90 pct of surface area is joined in as-forged condition.

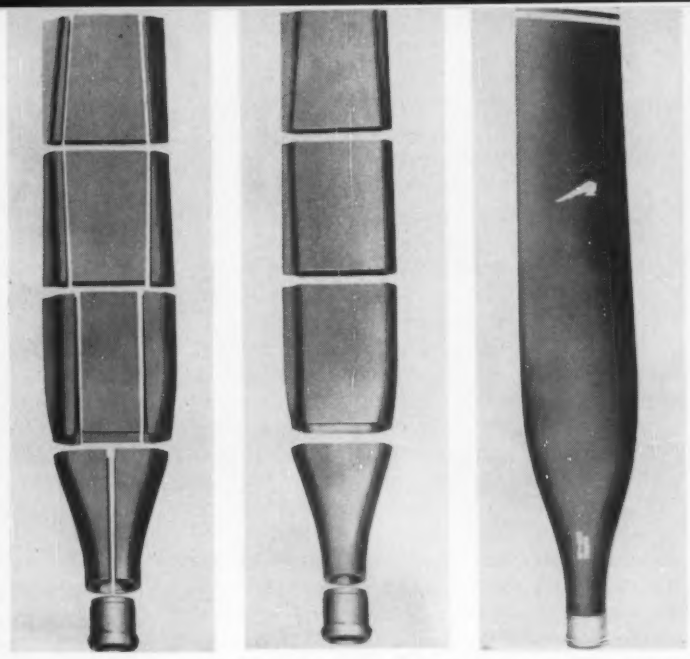


FIG. 3—Four major subassemblies plus detail parts are flash and fusion welded to form completed blade half. Tolerances are held by precision-forging small parts.

◆ OPTIMUM utilization of a raw material and of its physical properties is a critical engineering problem today in many metalworking plants. Advent of such high-priced metals as titanium highlights the situation, emphasizing the need for improved but still economical fabrication methods.

This need can best be met with a definite program encouraging a creative engineering approach. Result can be designs blending the real functional requirements of a part with the associated properties of the material.

One result of such a program is weld-fabrication of 19½-ft long blades with stringent design specifications to meet extremely high fatigue stresses in service. As-forged components, 32 in all, are joined by flash and fusion welding to form aircraft propellers requiring no additional shaping operations.

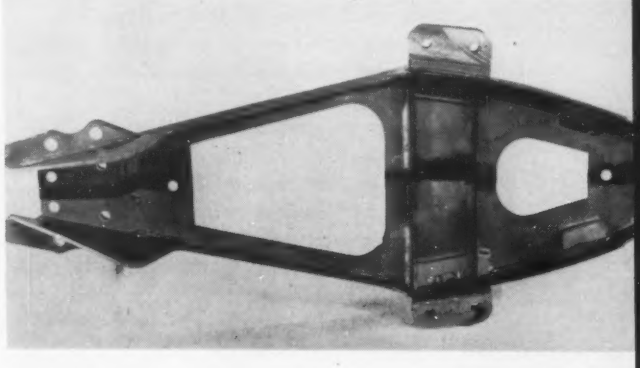
The same design approach also produces such assemblies as: 1) A sheet metal, web-like frame, weld fabricated from 19 precision-formed parts, and 2-lb lighter than its magnesium predecessor. 2) A fusion-welded engine mount produced from 10 segments to withstand up to 210,000 psi. 3) A high-impact trunnion that is repeatedly shock-loaded, yet is built up of four subassemblies with a total of 16 welds.

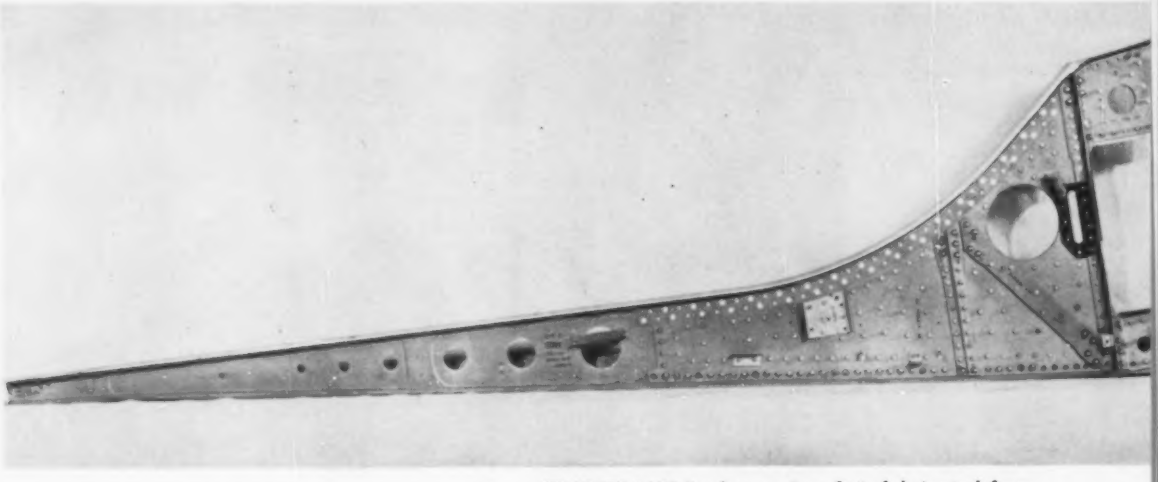
In these instances, A. O. Smith Corp., Milwaukee, combines improved welding techniques with other forming methods already practiced in its shop. Both are applied to materials of known physical properties to meet advanced design requirements, such as weight and high temperature considerations in modern aircraft of sonic speed and above.

Optimum utilization of material was a most important consideration, according to H. P. Moyer, the firm's Aeronautical Division Manager. A design approach is employed that tends to stimulate a creative, fresh and even candid look at the individual problems.

Assume a new alloy is under consideration for use in an assembly. Something is known of its properties under conventional forming methods. But these methods are costly or largely experimental when applied to the new material. What approach best insures most advantageous use of the material's range of prop-

FORWARD engine mount is built up from 10 segments, fusion welded, then heat treated to acquire tensile strength as high as 210,000 psi.





FLAP TRACK for large aircraft is fabricated from split rolled I-section joined by fusion welding, heat treated to 180,000 to 210,000 psi.

erties, while employing skills and machines in which money already is invested?

Systematically, the following steps seem essential:

1) Establish the real functional requirements of the component. Include all factors contributing to performance, such as magnitude and characteristics of loading involved.

2) List as potentially detrimental all favorable characteristics of the material not directly pertinent to and functionally required by the component. Temporarily forget these factors to concentrate proper and objective effort on blending functional requirements with associated properties of the material. In the back of the mind, store the information that some of these noncontributory properties can be plus factors in the final design, provided they appear as supernumerary items and do not contaminate the basic approach.

3) Compare functional requirements with known physical properties of the material.

4) Search current and experimental manufacturing techniques for forming, joining and treating methods even faintly applicable to the material. A. O. Smith chose welding as one promising technique, also likely to encourage later design improvements in components similar to those manufactured at the time of the study. Under other circumstances, consider such new techniques as introduction of ultrasonic energy during heat treatment. (See THE IRON AGE, December 8, 1955, p. 139.)

5) Develop a series of designs compatible with possible manufacturing methods. If the new material is costly or in critical supply, one goal of design work at this point should be greatest utilization of material within the framework of known forming methods.

It is completely unsatisfactory merely to duplicate an earlier or existing design when converting to a new material. The new designs may or may not resemble the earlier part. There is no reason why it should resemble the earlier part, as long as functional needs are met.

6) Consider tolerances at this point. There must be no carryover of tolerances from an earlier design. Where close tolerances are required, they obviously must be met. However, it is not valid to request a close tolerance for

How to design for future profit and conserve investment in current skills and equipment

1. **Establish real functional requirements of part.**
2. **Ignore properties of material not directly related to (1).**
3. **Correlate functional requirements with associated material properties.**
4. **Search current and experimental manufacturing methods for applicable techniques.**
5. **Develop a series of designs compatible with possible manufacturing methods.**
6. **Guard against carryover tolerances.**
7. **Select one design, weigh against necessary investment.**
8. **Watch for alternate ways to hold required dimensions.**

the primary reason that it was possible to achieve such close dimensions on the previous material. If close tolerances are required, they can be met provided proper new design is incorporated.

7) Select one component design or more offering acceptable performance, greatest utilization of material and greatest potential for later design improvement.

Fabricating economy enters the picture at this point with need for maximum utilization of current investment in men and machines. Where the most desirable manufacturing method requires an exorbitant investment, its advantages must be weighed against future use of the improved techniques made possible by purchase of new equipment.

8) Where precision dimensions are a factor, look for other ways to hold required tolerances than those now practiced. One method, weld-fabrication, calls for building up assemblies from relatively small parts, more often easier to control dimensionally than larger components.

Establish weld location, loading

If weld-fabrication is selected, establish location and allowable loading of welds. Set up safety factors and standard test methods to insure weld reliability.

Fabrication of a 19½-ft propeller blade is an example of this design approach in action. Previously, machining operations at A. O. Smith resulted in a comparably higher percentage of waste material.

Advances in welding methods were studied. Some seemed applicable to the job. Proposed designs accommodated existing equipment where possible, yet employed more advanced techniques promising better use of material.

Each propeller blade half is approximately 10-ft long and 1½-ft wide. It is made up of 16 individual components, subsequently joined into several subassemblies, then into a blade half by 14 flash welds and 1 fusion weld. Material utilization is roughly 60 pct.

Processing of sections begins with fabrication of trailing edges from round bar stock. After two pre-forges, the bar is splash-forged to a T-section. Operations are carried out in a high-speed mechanical forging press designed and built in 1942 by A. O. Smith.

The precision forging press is 9000-ton capacity with a 36-in. crankshaft and 6-in. throw. It is capable of striking in excess of 50 times a minute, and exerting high forging pressure on a relatively small area.

Coin rolling of the edge follows on a contour rolling mill, also designed and built by the firm some years ago. The contour roller itself is mounted on bearings within a head that is movable in a vertical plane within controllable limits. Under this roll is a sliding table or platen on which are clamped specific die forms.

As the slide is moved back and forth beneath the head, the roll is lowered atop the hot sheet. Metal is forced into the die configurations over which it is rolled. By this method, the hot metal is sculptured in any way desired. Only limitations are die size and degree to which the metal can be hot worked.

Propeller edges are then finished ready for fabrication in two folding operations.

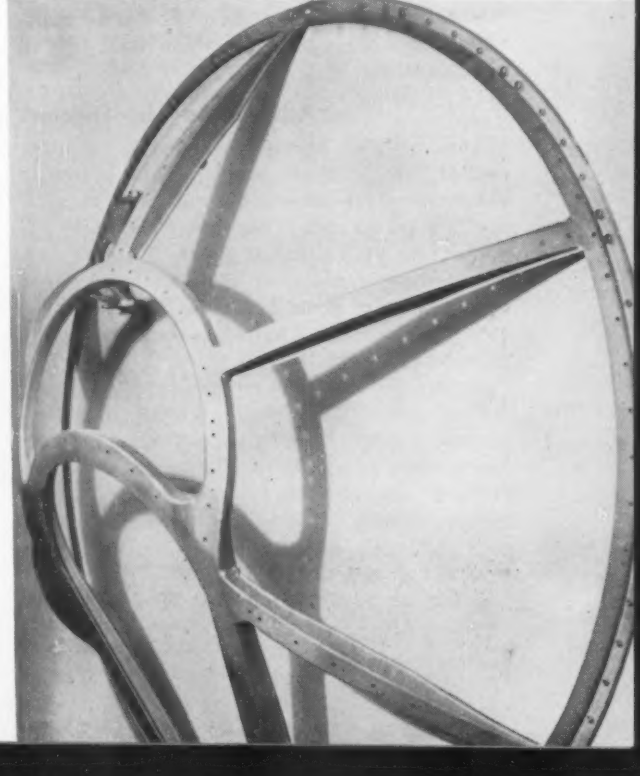
In assembling a propeller central section, two center plates are flash welded together. Trailing edge, then leading edge, is flash welded to the center plates. After completion of each weld, it is cleaned and inspected.

More than 90 pct of the entire surface area of the completed propeller is joined in the as-forged condition. Exceptions are plate edges, machined prior to joining. Employing precision forging and contour rolling techniques, subassemblies are accurately controlled dimensionally.

Remainder of propeller blade half is joined in similar fashion. Flash-welding is carried out on A. O. Smith equipment with a 50 sq in. capacity. The machine was designed for precision welding of high-strength components.

Special control devices are incorporated for continuous, high-quality welding. Welds are inspected with the help of oscilloscope comparison curves, supplemented by other nondestructive test methods.

SHEET METAL B-29 bomber nose replaces magnesium part, is 2-lb lighter. Frame is fabricated from 19 precision-formed parts, flash and fusion welded. Metal utilization exceeds 60 pct.



Eliminates recasting—

Permanent Dies Pare Hammer Stamping Costs

♦ SUBSTITUTING lead-Meehanite for lead-Kirksite tooling in the production of relatively large quantities of stampings has resulted in a considerable cost saving for Ryan Aeronautical Co., San Diego. This has been chiefly due to eliminating the need to recast tools.

First developed by Ryan during the early 1940's, the earlier dies are still among the most practical low cost tools for making hammer stampings in limited quantities. However, the Kirksite components tend to deform under repeated impact, making it necessary to replace such tools where more than a few hundred identical parts are to be produced. This holds true even where dimensional tolerances are fairly generous.

Meehanite dies have worked out well. Their stronger and more stable ferrous constituents permit their use with antimonial lead punches to maintain close tolerance production indefinitely. The comparative softness of the punches is not significant, since their Meehanite opposites enable them to retain their basic tooling configurations.

Advantages with stainless

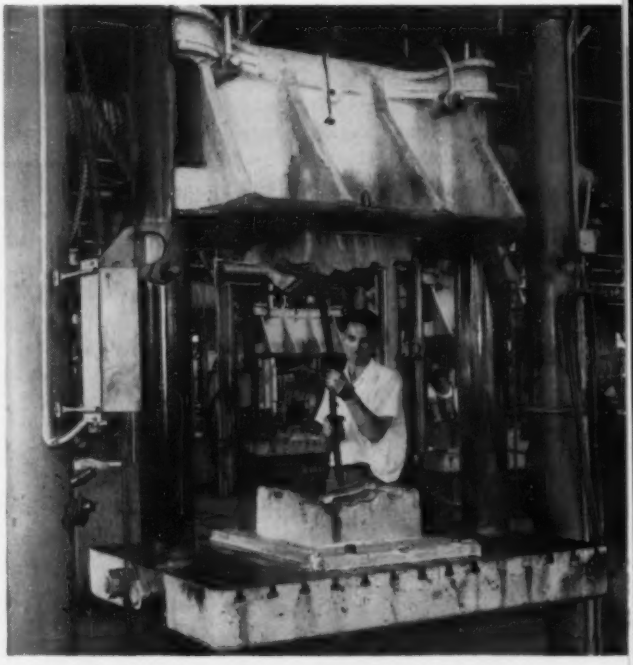
The new dies are more expensive. But the cost differential is not excessive, and is readily absorbed where increased production requirements must be met. They are particularly advantageous with stainless steels. Zinc contamination causes stainless steels to lose their characteristics. With Meehanite dies, the necessity for dezincing all stainless steel parts after forming is eliminated.

Stamping quality has not been a factor either for or against Meehanite tooling thus far, though sharper details are being obtained. Meehanite dies also have an inherent lubricity, probably due to their graphite content which reduces galling. This is important in forming such materials as stainless steels, aluminum superalloys and titanium.

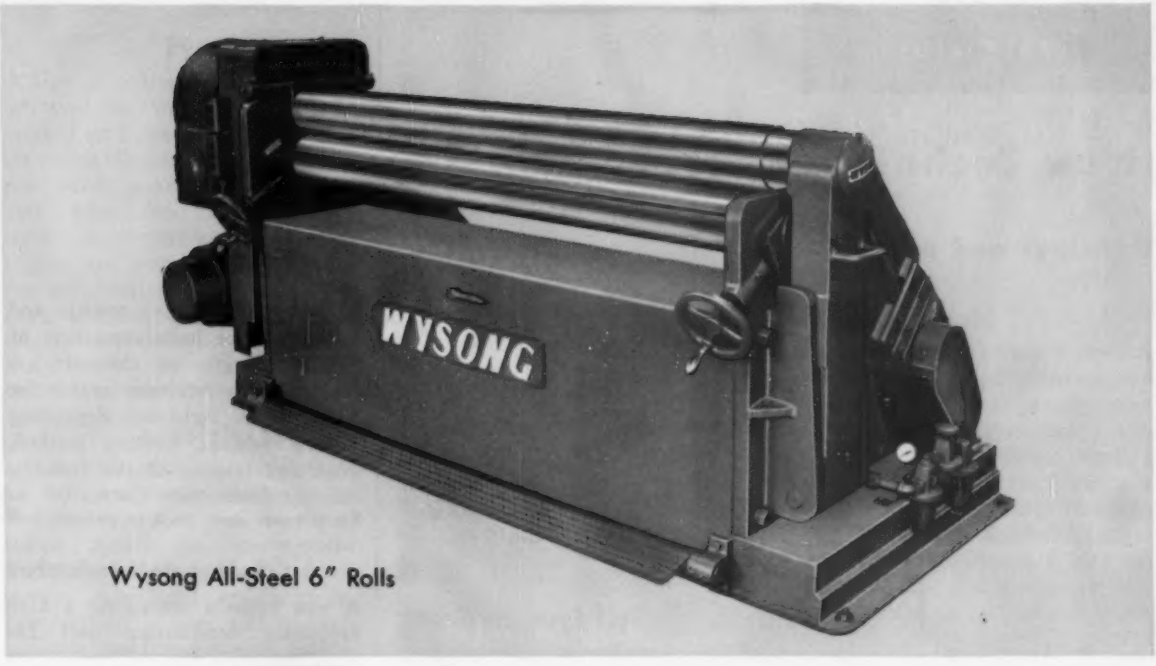
A further advantage is that Meehanite dies can subsequently be flame-treated, if necessary, in areas where maximum hardness is essential.

Dies are cast by Lincoln Foundry, Los Angeles, then used by Ryan to make their mating lead punches. This consists of providing each die with a flask or retaining walls so that it can be used as a mold in casting molten antimonial lead. A parting agent prevents adhesion of lead to the Meehanite surfaces.

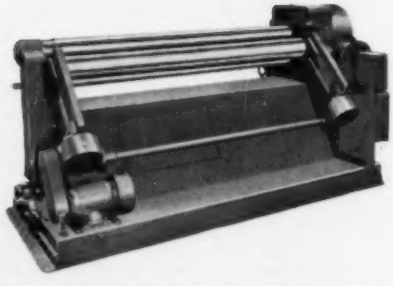
Various size Meehanite hammer dies have been used by Ryan. The largest thus far measures 24 x 48 x 10 in., and weighs in at approximately 1½ tons.



LEAD-MEEHANITE tooling, gravity drophammer equipment permit large quantity production of stainless steel exhaust system components, without need for dezincing formed parts.



Wysong All-Steel 6" Rolls



Rear view. Motor at left provides power for adjustment of rear roll. Air vitalizer section of air operation of drop end is shown on left end.

Top push button panel controls rear roll. Lower panel provides stop, start and reverse for roll drive.

Hand lever controls air valve for lifting top roll.

New WYSONG All-Steel 6-INCH ROLLS

Wysong All-Steel Bending Rolls have created a *new* standard for safety and ease of operation. They are available in 4¼ inch, 5 inch and 6 inch diameters and working lengths from 36" through 120".

Wysong rolls are of the initial or pinch type. High production and safety features include:

- Single hand wheel for parallel adjustment of rear roll (power adjustment with ¾ HP magnetic brake motor optional on 6" series.)
- A single lever to release drop end. Lowering drop-end raises top roll. (Air power operation optional on all models.)
- Safety treadle extending full length. Stepping on treadle stops machine.
- 7½ H.P., 1800 R.P.M. drive motor (magnetic brake motor optional.)
- Worm gear drive runs in oil.
- Accurately machined, alloy steel rolls, grooved to buyers specifications.
- Easy-to-read, roll-setting indicator scales.

See your dealer or write to factory for full information. Wysong also builds power, air-power and foot-power squaring shears and hand-operated slip roll formers. Wysong & Miles Co., Greensboro, N.C.

WYSONG

NATIONAL MACHINE TOOL BUILDERS ASSN. MEMBER

"Buy a Wysong . . . It's Miles Ahead"

New Technical Literature:

Catalogs and Bulletins

Hydraulic fluid

A new, 8-page bulletin describing fire resistant hydraulic fluid has been released by a manufacturer of oils, chemicals and packings. The bulletin contains factual information on installation and maintenance of this safe fluid where potential fire hazards exist. Technical data is given on installation as relating to packings, pumps, strainers, filters and other parts of the system. The importance of pumpability at low temperature and storage stability are also covered. Typical uses are also outlined in this folder. *E. F. Houghton & Co.*

For free copy circle No. 1 on postcard, p. 89

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 89.

Belt type furnaces

A line of continuous belt type furnaces is described with text, photographs and diagrams in an 8-page folder. Covered are flat surface belts with cast alloy links; slats, hinged and woven mesh; and broken-surface belts consisting of flights, troughs or channels. A chart gives a reference source for selecting the right belt depending on the process, heating method, work and loading of the furnace. *Surface Combustion Corp.*

For free copy circle No. 2 on postcard, p. 89

Sulfur determinator

A new bulletin describing a high frequency combustion unit for rapid determination of total sulfur in diesel fuel, kerosene, oil sludges, lubricating oils, lubricating oil additives, tars, asphalts, spent caustics, catalysts, and other inoragnic materials has been issued. The method used for determining total sulfur in petroleum product is outlined including specifications and a listing of accessories to comprise a package unit. *Lindberg Eng. Co.*

For free copy circle No. 3 on postcard, p. 89

Water softeners

Water softeners for industrial plants, institutions and commercial establishments, are described in a bulletin just issued. Cutaway drawings illustrate the construction of the softeners and indicate the connections by which a softener is fitted into a water system. The capacities of various models are given, together with other specifications of each model. *Hagen Corp.*

For free copy circle No. 4 on postcard, p. 89

Grinder

A precision double spindle grinder which grinds two parallel surfaces in one operation is described in a new, 16-page catalog. Design features, operating advantages, dimensions and specifications as well as a step-by-step explanation of the unit's disk changing are included. *Gardner Machine Co.*

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SAVE!

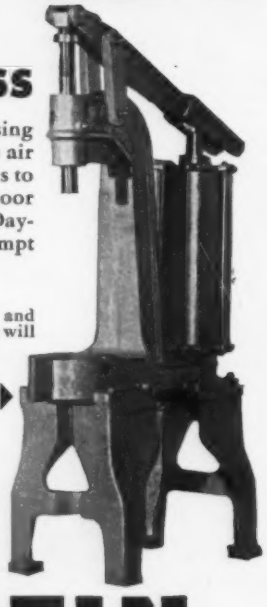
WITH A HANNIFIN AIR PRESS

It's the ideal press for that occasional pressing job. These presses operate off ordinary shop air supply. They're fast and safe. Over 30 models to choose from...many for either bench or floor mounting. Capacities from ½ to 18 tons. Daylight to 46 inches...reach to 12 inches. Prompt delivery.

WRITE. Complete information and prices on Hannifin Air Presses will be sent on request.

6 Tons (Model B-2) One of more than 30 models. Press with base, $554.

1-ton Hand-D-Press. For small parts manufacturers. Press, $232.



Prices F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

HANNIFIN

HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS

Eye protection

A line of optical plastic products designed as "eye savers" is described in a new catalog. Among the items discussed and illustrated are: safety spectacles for comfort and long wear; methacrylate lenses, multi-purpose safety spectacles, eye protection accessories for prescription wearers, welding goggles, cover goggles and face shields. *Watchemoket Optical Co., Inc.*

For free copy circle No. 6 on postcard, p. 89

Industrial haulers

A line of custom-built equipment for industrial transportation is described in a new, well-illustrated folder. Among the types covered are off-highway trailers and truck bodies; mine and quarry cars, light industrial cars and trailers, motor-driven transfer cars, heavy-duty industrial cars and intraplant trailers. *Easton Car & Construction Co.*

For free copy circle No. 7 on postcard, p. 89

Steam cleaners

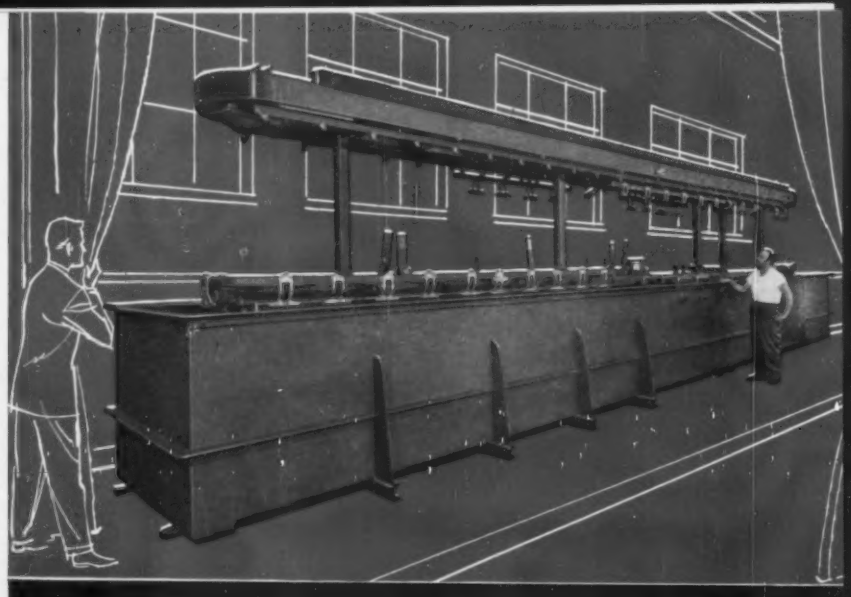
A new, 4-page catalog-in-brief, describing and picturing one firm's steam cleaner line is off the press. It tells concisely the difference between high pressure combination HPC models, steam vapor models, and fireless steam cleaners; shows action pictures of each of the 8 basic models; suggests where each model fits best; and contains an easy-to-read chart of cleaning actions, pressures, temperatures, and capacities. *Malsbary Mfg. Co.*

For free copy circle No. 8 on postcard, p. 89

Silicone guide

The new 1956 reference guide to Dow Corning silicone products has just been published. The new edition describes almost 150 of the most generally used silicone products, 18 of which were first introduced within the last 12 months. The products are grouped by physical form (fluids, compounds, greases, resins and rubbers) and cross-indexed by usage (dielectrics, defoamers, damping media, etc.). Thoroughly illustrated with charts, tables, graphs and application photographs. *Dow Corning Corp.*

For free copy circle No. 9 on postcard, p. 89



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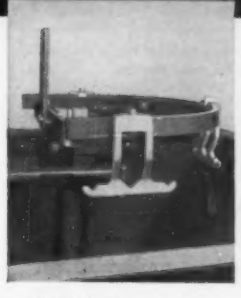
for High Production . . . Lower Cost Plating



Special alloy carriers for high conductivity.

Variable rack spacing —one man operation.

Compact design requires minimum floor space.

The Udylite Cyclemaster is a new, completely automatic plating machine which offers the greatest production of any machine built with comparable floor size.

A versatile, standardized machine, it is adaptable to most plating processes. The initial cost is low, considering its high production capacity. One man can keep it operating at full capacity.

The Cyclemaster will handle up to 120 racks per hour and take a rack up to 16″ by 36″. Being only 41 feet, 6 inches in length and moveable, it will fit into most straight line production operations.

All Cyclemaster units are equipped with a new multi-purpose carrier which can be used for double or single spline racks. Made of special alloy metal, it has high structural strength and highest conductivity.

Built on a rugged steel base, it is easily moved and installed. It can be shipped as a complete unit or in two sections which require only bolting together.

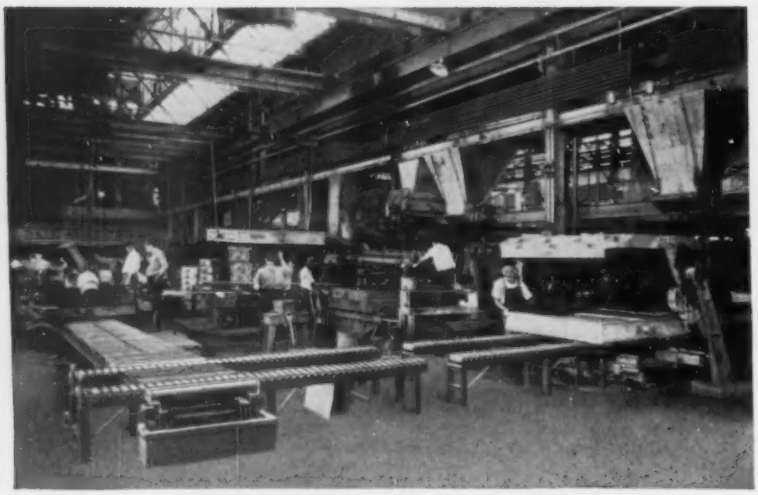
Like all Udylite automatics, the Cyclemaster is completely assembled at the factory and run in before being shipped. Each machine incorporates Udylite features of design and construction that have been so well accepted by the plating industry. The drive is hydraulic.

For more details of the Cyclemaster—or any other Udylite equipment—consult your local Udylite representative or write today to The Udylite Corporation, Detroit 11, Michigan.

THE Udylite CORPORATION DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

Ask Standard ⋮ how to cut costs with conveyors



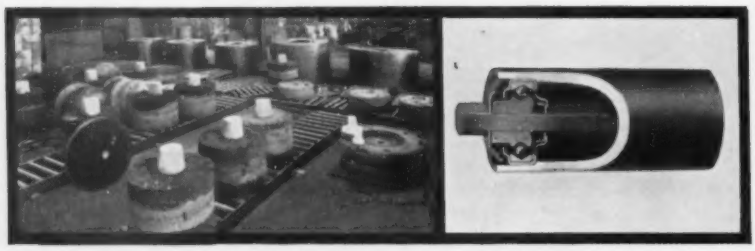
Parallel roller conveyor lines facilitate movement of large molds to pouring area. Note simple right angle transfer device.

Job-tailored conveyor systems speed, simplify foundry work

GOOD foundry practice requires smooth handling of molds and cores to reduce losses due to "shifting" or "collapse".

This can be achieved with Standard Gravity Roller and Power Conveyors. Standard's *50 years experience* in engineering and manufacturing *foundry conveyors* can be valuable to you.

Before you embark on any modernization program it will pay you to call STANDARD CONVEYOR COMPANY, General Offices, North St. Paul 9, Minn. Sales and Service in Principal cities.



Steel foundries handle cumbersome molds easily on simple low cost roller conveyors. Special design shielded bearings for rough foundry use give longer life, low maintenance.

Send for Standard's special catalog — a valuable reference book illustrating and describing various conveyor installations in leading foundries. Ask for "Conveyors for Foundries—M-1."

Standard 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

Sales and Service in Principal Cities.

FREE TECHNICAL LITERATURE

Welding fittings

A 6-page folder identified as FB-500 furnishes in concise form the types and size ranges of various welding fittings and flanges which can be furnished by one manufacturer. The folder was prepared by the company's tubular products division which manufactures seamless and welded tubular products in carbon, alloy and stainless steel for all types of pressure and mechanical applications as well as seamless welding fittings. *Babcock & Wilcox Co.*

For free copy circle No. 10 on postcard, p. 89

Galvanized ware

Color photographs of the complete line of hot dipped galvanized ware of the Jones & Laughlin Steel Corporation are included in a new 12-page catalog. The catalog includes capacities, dimensions and shipping weights of one company's galvanized products. The firm's line includes pails, well buckets, wastebaskets, utility tubs, garbage pails, both residential and industrial sprinklers, coal hods, fuel containers and funnels. *Jones & Laughlin Steel Corp.*

For free copy circle No. 11 on postcard, p. 89

Carbide tools

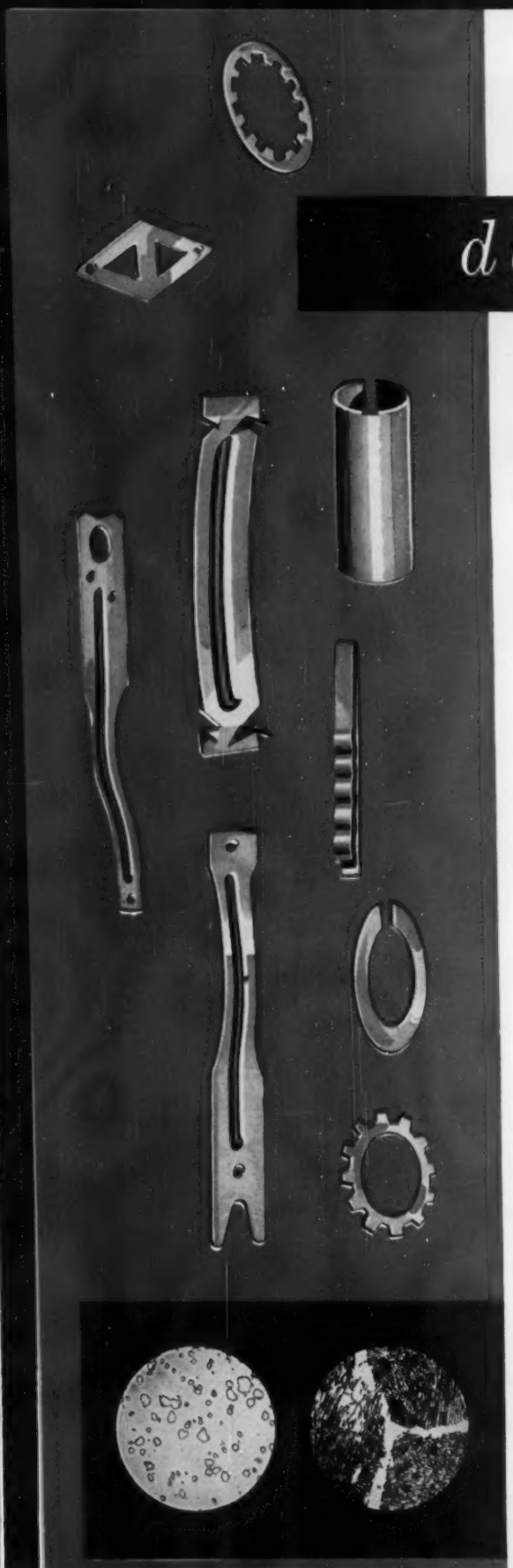
The availability of a new carbide tipped tool catalog is announced. The booklet contains 12 pages of charts and descriptions of the various types, sizes and styles of standard and special carbide tipped tools offered by one company. In addition to the specific information included on their products, the new catalog contains data on carbide tipped tools in general and many illustrations of their proper application. *Besly-Welles Corp.*

For free copy circle No. 12 on postcard, p. 89

Plant construction

Design, engineering, construction and initial operation of process industries plants are outlined in a new catalog, entitled "Process Plants by Blaw-Knox." Illustrated with photographs of major projects, the brochure is designed to provide information on work undertaken and completed in the process industries field. *Blaw-Knox Co.*

For free copy circle No. 13 on postcard, p. 89



dependable!

WEIRTON

high carbon strip
cold-rolled spring steel

for high-speed blanking or forming

Where high fatigue-resistance is a principal factor, Weirton cold-rolled spring steel furnishes high carbon strip in the consistent uniformity necessary to meet the most exacting requirements of a wide variety of products. The close manufacturing control featured at Weirton results in several unique and highly desirable qualities—such as accurate response to heat treatment . . . uniformity of gauge and width . . . uniform chemical and physical properties . . . exact consistency of grain structure . . . controlled decarburization limits.

Pearlitic and spheroidized structures are available with desired chemical analyses and for specific heat treating and hardness. When you call Weirton you call for easier blanking and cold forming. And, at Weirton, you get what you call for.

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION

The photomicrograph on the left illustrates Weirton high carbon strip that has been spheroidized and annealed—soft and ductile—ideal for cold-forming operations. The one on the right shows the pearlitic steel structure, temper-rolled in controlled hardness and strength for clean, economical blanking procedure.

WEIRTON STEEL COMPANY

Atlantic Steel adds their second 75-ton Lectromelt* Furnace

SOUTHERN steel production received another boost early this winter when Atlantic Steel Company's new electric furnace began operation. This 75-ton Lectromelt Furnace is the second such unit to be installed by this Atlanta, Georgia, firm during the past three years.

125,000 tons of steel per year are added by this new furnace, increasing their ingot capacity by 30%.

Atlantic Steel laid out this plant, from scrap storage yard to pouring pit, around these Lectromelt Furnaces. This fact, plus the economies of time and labor contributed by Lectromelt's top-charging and ability to pour on the power, account for the higher production and constant increase in quality being achieved here.

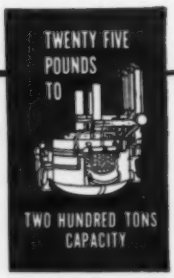
Pittsburgh Lectromelt Furnace Corporation, 312 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in...GERMANY: Friedrich Kocks GMBH, Dusseldorf...ENGLAND: Birlec, Ltd., Birmingham ...FRANCE: Stein et Roubaix, Paris...BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege...SPAIN: General Electrica Espanola, Bilbao...ITALY: Forni Stein, Genoa...JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

MOORE RAPID

WHEN YOU MELT... *Lectromelt*



FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 84

Refractories

New 50-page loose-leaf catalog describes the complete line of ADA fire brick, mortar and castibles. Catalog contains many tables and charts showing heat gradient, expansion and chemical analysis for a wide range of refractory products for applications up to 3300°F. Complete application, mixing and installation instructions are also given. *Botfield Refractories Co.*

For free copy circle No. 14 on postcard

Transport tubes

A new catalog, "Airtube On Target," is a 50-page, multi-colored, hard covered book describing several sizes of airtube systems, central desk and semi and automatic switch systems as well as a variety of carriers that are available. An entire section is devoted to describing in detail the variety of carriers that are offered along with outline diagrams of each type. *Lamson Corp.*

For free copy circle No. 15 on postcard

Ratemeter

A new, 4-page folder gives complete data on a ratemeter (Type 12112 frequency meter). Technical information covers operation and application of the six-digit high-speed scaler for proportional, scintillation or Geiger counting. Specifications include maximum and minimum rates, resolving time, total capacity, zero reset, connections, controls, operating characteristics, sensitivity and dimensions. *North American Philips Co., Inc.*

For free copy circle No. 16 on postcard

Cement mix data

Reference booklet was produced to give users data on structural and refractory concrete made with high alumina cement. Among the tables included are the following: cement content of mixes for structural and refractory concrete; quantities of materials for structural and refractory concrete mixes; sieve analysis; fineness modulus of aggregates; approximate thermal conductivities of various types of concrete; and many others. *Lafarge Aluminous Cement Co., Ltd.*

For free copy circle No. 17 on postcard

Roof exhauster

Literature is available describing a new roof exhauster built of heavy wall, extruded aluminum sections. Designed to provide a more efficient and better-styled unit, the exhauster incorporates such features as light weight and welded joints. It is reported as leak-proof. *Iron Lung Ventilator Co.*

For free copy circle No. 18 on postcard

Screw threads

"The Correlation Between Screw Thread Standards and Gaging Systems" makes interesting reading for anyone in this field. It points up the controversy between those who argue that "ring" type gages are the standard means of inspecting external threads and those who claim this assumption is false. The latter group point to a government paper stating that "it would be inadvisable to specify any definite method as standard." "Politics," says the author, C. V. Johnson, "can only complicate pitch diameter problems." *Johnson Gage Co.*

For free copy circle No. 19 on postcard

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 1/26/56

Circle numbers for Free Technical Literature or Information on New Equipment:

1	2	3	4	5	6	7	8	9	10
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21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

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Your Name

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Title

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Company

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Co. Address

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City Zone

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State

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
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City Zone

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State

Carbide drills

A line of carbide drills for high speed production of precision holes from the solid in cast iron, aluminum, and bronze is described and illustrated in a new engineering data sheet. Space is given to discussion of speeds and feeds; drill construction; thrust, horsepower, and machine tool requirements; as well as drill accuracy and life, plus suggestions on coolants and coolant handling equipment. *Star Cutter Co.*

For free copy circle No. 20 on postcard

Company profile

Engineering, research, production of raw material, quality control and plant operations are described in a booklet prepared by a producer of aluminum products. Booklet is designed to acquaint the reader with the company's facilities. *Harvey Aluminum Div. of Harvey Machine Co., Inc.*

For free copy circle No. 21 on postcard

Hand forgings

Minimum mechanical property guarantees for all classes of hand forgings produced by one firm's forging plant are charted in a new folder. Designed for use as a wall chart, looseleaf insert, or self-contained filed folder, the folder tabulates tensile and yield strengths and elongation percentages of hand forgings made from aluminum alloys 2014-T6 and 7075-T5 in various sizes up to 2000 lb. *Kaiser Aluminum & Chemical Corp.*

For free copy circle No. 22 on postcard

Abrasives

A bulletin describing a cast steel, heat treated, blast cleaning and peening abrasive, has been published. The eight-page illustrated booklet includes a discussion of the automatic process and quality control exercised in the manufacturer's plant. Other sections of the booklet include a tabular comparison of the characteristics of the various types of metallic abrasives. Also included is a discussion of the factors important to the economical and efficient consumption of abrasive. *Wheelabrator Corp.*

For free copy circle No. 23 on postcard

Tape

A new brochure describing Polyken Tapes (T Series), numbers TD-14-2 and TA-44-2 is available. Designed for large volume users whose job specifications require a specialized tape they provide the proper combination of adhesive and backing. One is a low adhesion tape that does not build up adhesion over an extended period of time, and was designed for special applications requiring low adhesion, and maximum protection plus ease of removal. The other gives protection against heat and moisture and was produced after a request from the aircraft industry for such a tape. *Polyken Products.*

For free copy circle No. 24 on postcard

Palletized molybdenum

A descriptive pamphlet discusses the immediate availability of molybdenum packaged in convenient burlap bag or can containers and also palletized for ease of handling. According to the literature, the decision for palletized molybdenum came as the result of inquiries from plants using it in quantity and the desire to improve safety conditions in lifting and handling. *Molybdenum Corp.*

For free copy circle No. 25 on postcard

Metal hose

A 12-page, 2-color, illustrated catalog (No. 152) on a complete line of flexible metal hose has just been released. A full page of flexible metal hose products are covered along with complete coupling data. An easy 4-step metal hose selection guide is included. *Flexonics Corp.*

For free copy circle No. 26 on postcard

Portable air tools

Bulletin No. 53 illustrates and gives the specifications for assembly tools (screwdrivers, nutsetters and impact wrenches); drills (from ¼ in. to 2 in. capacity); small wheel grinders (up to 3 in. straight wheels); straight grinders; vertical grinders; and scalers, chippers and rammers. *Rotor Tool Co.*

For free copy circle No. 27 on postcard

standard for comparison

...and with high speed steels the standard is REX

Living up to a standard for comparison isn't easy. That's why Crucible lavishes special care on the manufacture of REX® high speed steels... to keep REX the *standard* wherever high speed steels are used—as it has been for over half a century.

It's easy to *prove* the superiority of REX. Use it on the job... check its size, structure, response to heat treatment, fine tool performance. You'll agree with thousands of other users—*you can't find a high speed steel to outperform REX.*

Remember, REX is made only by Crucible. So call for REX at any Crucible warehouse, or for quick mill delivery. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

TESTING: Better Notch Impact Test Developed

Sample preparation time cut by one-third, greater accuracy obtained in new method of testing transition point between ductile and brittle zones of metals . . . Impact guillotine is used.

A new notch impact test now being used by materials engineers at the Westinghouse Electric Corp. uses an impact guillotine and a much larger sample, 14 in. long by 3½ in. wide, by 1 in. thick.

Although long used as a method for determining the transition point between ductile and brittle zones of metals, the original method had some major disadvantages. For example, sample preparation took considerable time and a V-shaped notch had to be accurately machined 79 mils deep into one side of the small sample. A pendulum-type apparatus broke the sample by swinging a weight against it. Final data was in the form of a graph with impact energy for rupture plotted against the temperature of the sample.

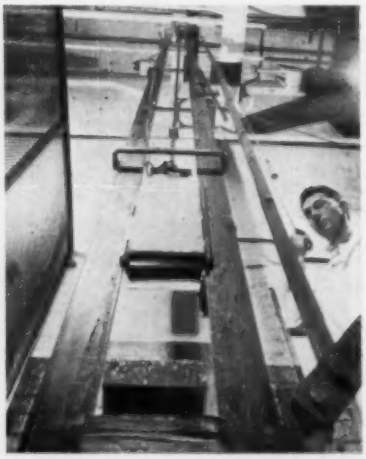
WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 89. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Even after elaborate preparations and careful technique, the exact temperature of the transition was not clearly defined.

Artificial Crack Used

Now, instead of the notch, a weld bead is put on the bottom side of the sample and an artificial crack put into this weld by means of an abrasive cutting wheel. A standard weight is dropped on samples at various temperatures and the transition temperature readily bracketed within a narrow range.



Sample preparation is reduced by guillotine method.

Results Reproducible

For example, if trials at minus 20 degrees F show breakage each time, and trials at plus 20 degrees F produce no breakage, the transition point is clearly defined within useful limits.

Results are reproducible by the guillotine method and sample preparation has been cut to one third that of the older method.

Westinghouse calls the method "another step that's making the metallurgist's job a little easier."

NON-FLUID OIL
TRADE MARK REGISTERED

A Must for High-Speed Motors

The only change in lubricating methods when you switch to NON-FLUID OIL is that you require less frequent application, because it stays *in* the bearings and *lasts longer.*

The big difference is in the quality of the lubricant. NON-FLUID OIL prolongs the life of bearings, and your motors run cooler, are cleaner and require less maintenance, regardless of the type of bearings.

Send for a sample of NON-FLUID OIL and see for yourself why it lasts three times as long as ordinary lubricants.

NEW YORK & NEW JERSEY LUBRICANT COMPANY
292 Madison Ave., New York 17, N. Y. • Works: Newark, N. J.

WAREHOUSES: Birmingham, Ala. • Atlanta, Ga. • Columbus, Ga. Charlotte, N. C. • Greensboro, N. C. • Greenville, S. C. • Chicago, Ill. Springfield, Mass. • Detroit, Mich. • St. Louis, Mo. • Providence, R. I.

Also represented in other principal cities

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

Machine Tools:

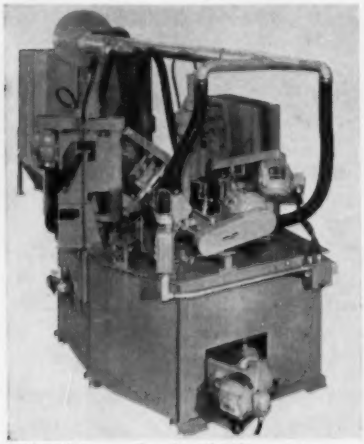
Unit deburrs 200 parts in one hour.

An addition to production lines is a new automated machine with which two hundred multi-slitted, broached parts are deburred in one hour.

An operator places the gear or part on an expanding collet which holds it in place while it moves around an automatic indexing table. The part travels through five brushing stations and is indexed into four different positions, thus presenting all sides of the chucked part to the brushes for the proper length of time. Since every part bears against the brush with the same amount of pressure, uniform and consistent results are obtained.

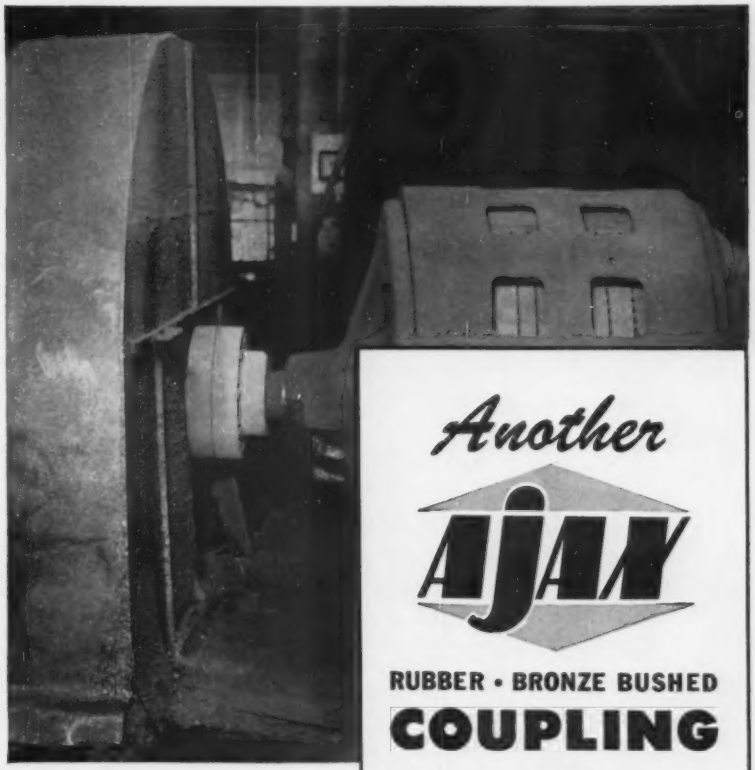
Uses Five Brushes

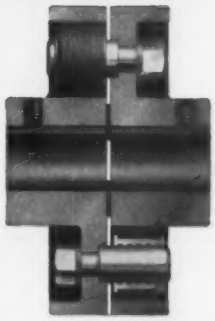
The machine uses five brushes which are wheel brushes made by driving a heavy wire staple through a round steel channel to anchor each tuft individually. These crimped steel wire brushes are 8 in. in diameter and revolve at about 3000 rpm. Their penetration of the work is approximately 0.060 in. The brushes can be adjusted to compensate for wear by turning hand wheels on each brush station individually.



All sides of chucked part are reached by deburrer.

In dry brushing, the metal particles are drawn off by a vacuum system, using hoods about the





HOW THEY WORK

● Since it is impossible to mount two shafts, each in its own bearings so that they will rotate around the same axis, it is imperative that the couplings which surround these shafts permit each shaft to rotate around its own axis without creating vibration, backlash, strain or wear, reversal of torque, and all other detrimental factors that enter into direct connection of power. Misalignment between shafts of driving and driven machines is a serious overload factor contributing to rapid bearing wear. This is intensified by today's demand for high operating standards, increased loads, and space limitations.

Another

AJAX

RUBBER • BRONZE BUSHED

COUPLING

Running for 30 Years Without One Cent for Maintenance (Nobody Even Wiped the Dirt off)

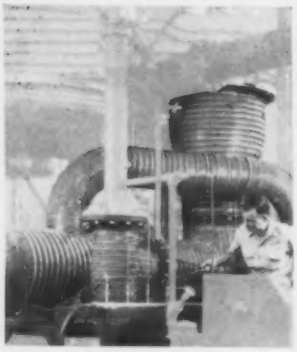
This Ajax Rubber-Bronze Bushed Coupling has been operating continuously in heavy duty steel mill service without attention for years and years and years.

When you remember that all the horsepower goes through the coupling, the importance of safeguarding direct-connected machines against misalignment is obvious.

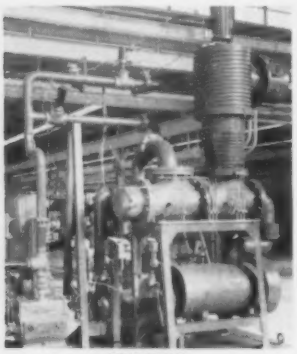
Ajax Flexible Couplings are quiet running and require no lubrication. There is no objectionable backlash. Elimination of shut-downs of machines and entire departments is far more important than their low first cost.

Ajax engineers have specialized on flexible couplings for 35 years. It will pay you to put your drive problems up to Ajax.

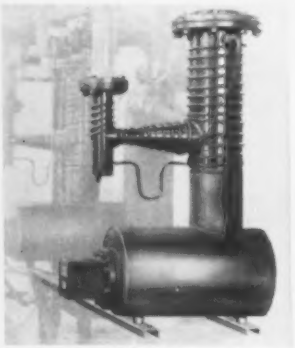
AJAX FLEXIBLE COUPLING CO. INC.
Westfield, N. Y.
Representatives in Principal Cities



KS-16000
Typical application: 1000# melting and casting furnace.
Speed for air: 18,000 liters/sec. at 4 microns.
Throughput for air: 1,000,000 micron-liters/sec.
Ultimate pressure: 4 x 10^{-4}mm Hg.



KS-4000
Typical application: 350-500# melting and casting furnace.
Speed for air: 4,750 liters/sec. at 5 microns.
Throughput for air: 90,000 micron-liters/sec.
Ultimate pressure: 2 x 10^{-4}mm Hg.



KS-600
Typical application: 5-50# melting and casting furnace.
Speed for air: 750 liters/sec. at 5 microns.
Throughput for air: 6,000 micron-liters/sec.
Ultimate pressure: 1 x 10^{-4}mm Hg.

High throughput...

low pressure

How to get both with one high-vacuum pump

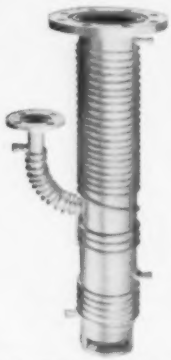
PROBLEM: How can you best pump a chamber at the pressure range which is *too low* for mechanical pumps to work at peak efficiency, *too high* for most diffusion pumps? In most metallurgical processes this is the very range where peak gas loads occur.

SOLUTION: CVC's KS oil diffusion-ejector pumps. The KS pumps have tremendous throughput in the critical pressure area mentioned. Their ejector stage quickly removes the great bulk of the gas left after initial mechanical pumping. In the one to five micron Hg pressure range, their diffusion stage swings in and drops pressure to as low as 10^{-4}mm Hg.

RECOMMENDATION: When you want to produce and hold a low pressure and you want it done economically, consider a *CVC* KS pump.

NOTE: Another important design feature for metallurgists is the extra-wide, unobstructed clearance between jets and pump casing in the KS series. The dust found in most of your processes and equipment will *not clog or damage* the jets of these pumps.

For further information, write for data sheets. Please specify your application.



KS-200
Typical application: Small melting and sintering furnace.
Speed for air: 350 liters/sec. at 10 microns.
Throughput for air: 6,000 micron-liters/sec.
Ultimate pressure: 1 x 10^{-5}mm Hg.

CVC Headquarters for High Vacuum

Consolidated Vacuum Corporation Rochester 3, N.Y.
a subsidiary of CONSOLIDATED ENGINEERING CORPORATION, *Pasadena, California*

CVC sales now handled through Consolidated Engineering Corporation with offices located in: Albuquerque • Atlanta • Boston • Buffalo • Chicago • Dallas • Detroit New York • Palo Alto • Pasadena • Philadelphia • Seattle • Washington, D. C.

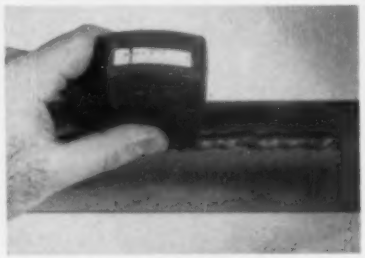
brushes to carry off the chips. Each machine is specifically designed to deburr a special gear or part.

The unit was developed by the Machine Division of the Fuller Brush Company, Hartford, Conn.

Inspection:

New method simplifies, speeds weld testing.

Because high alloy stainless steel welds are susceptible to hot cracking when deposited under conditions of restraint, a small proportion of ferrite (iron) is necessary to counteract this susceptibility. However, if the weld contains too small a porton of ferrite and is exposed to temperatures of 1000° to 1600°F for any length of time, the ferrite (islands in the stainless steel weld) can change to the hard and brittle phase, with a consequent reduction in the ductility and impact resistance of the steel. The proportion of ferrite however,



Compact unit measures iron content of stainless weld.

should not be so much that the metal is unduly embrittled if it is maintained for any length of time in that range of temperature in which ferrite transforms.

Previously Tedious

The method used in the laboratory for the determination of the ferrite content of stainless steel welds is somewhat tedious and is not of immediate use to a welding engineer or metallurgist who may wish to obtain a rapid indication of the ferrite content at various points along a weld by a non-destructive method.

An instrument for measuring the iron content in a stainless steel

Heppenstall's custom-built back-up roll sleeves . . .

. . . work to your over-all cost advantage

Heppenstall Back-Up Roll Sleeves enable you to roll record tonnages . . . decrease downtime . . . and effect over-all cost reduction. They give longer working life in today's high-speed mills because their up-to-the-minute design permits utilization of more effective forging and heat treating operations in their production. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

These mandrel-forged sleeves—made from highest quality Heppenstall-produced alloy steel—are worked thoroughly under modern hydraulic presses to produce a finished product having both maximum density and grain refinement. In addition, they offer you exactness of fit and greater resistance to cracking and spalling during high-speed rolling.

All Heppenstall sleeves are fitted to extremely close tolerances which prevent circumferential slippage. Longitudinal movement is also eliminated because they are further locked in place by both a shoulder and Heppenstall's own patented locking ring.

Heppenstall also produces forged arbors . . . has facilities to grind both arbors and sleeves for perfect shrink-fitting.

For additional information and technical assistance, contact Heppenstall Co., Pittsburgh 1, Pennsylvania. Sales offices are located in principal cities.

Heppenstall

The most dependable name in forgings

THE FINISHING TOUCH

"LITTLE STEVE" PAYS OFF

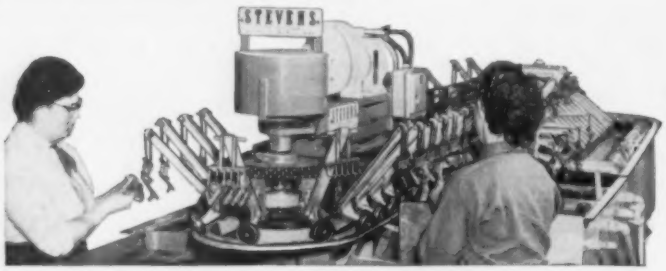
by A. B. HOEFER
vice president
FREDERIC B. STEVENS, INC.

Production Plater Finds Machine Ideal For Zinc Plating

There's a feeling of satisfaction among the people in our company when a Stevens machine is installed and does a better job than the customer anticipated. That feeling reaches all the way from President through engineers, salesmen and typists who write up the specifications.

We are particularly proud of an installation of one of our "Little Steve" machines made recently for the Miller-Smith Manufacturing Company, Spring Lake, Michigan. The partners, John Miller and George Smith, are operating an aggressive business in job buffing and plating, and after receiving some of our literature including a story on the "Little Steve," soon made a purchase from us.

The "Little Steve" fit ideally into their program. The capital outlay met their requirements and the machine is daily turning out a big quantity of zinc plated parts for them. In fact, 105,000 can be plated each working day, which right now is an around-the-clock operation. Just as soon as new racks are built they expect to double present production on some of the parts.



The Miller-Smith management tell us that they are operating much more efficiently now than they did previously with a competitive machine. Parts are being zinc plated to a .0002 thickness every three minutes. They are saving on valuable floor space too, for the "Little Steve" occupies only 162 square feet as compared to 441 square feet used by their previous equipment.

When we asked for comments about the "Little Steve" from Messrs. Miller and Smith, they said: "We are well pleased with the machine —in fact, we're proud of it. We'll be glad to recommend it to anyone." While we are not unused to such comments on our various machines, each new one gives us a warm glow of satisfaction.

This efficient machine fits easily into existing factory layouts because of its size. Only seven feet wide and ten or more feet in length, it can be placed on a factory floor without moving existing machinery.

For further information write to Frederic B. Stevens, Inc., Detroit 16, Michigan.

FREDERIC B. STEVENS INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

BRANCHES:
Buffalo • Cleveland • Indianapolis • New Haven

weld, called the elcometer, is now available. It is a pocket-size unit and its operation is based on the principle that the increase of magnetic flux intensity between two soft iron test probes of a U-shaped magnetic circuit reduces the forces on a spring-loaded magnetic needle in a parallel magnetic branch. The tension of the spring can be adjusted so that the needle gives a scale reading corresponding to the ferrite content of a standard reference sample. In this way, using a set of standard reference samples for materials of different thickness the ferrite content of production welds can be rapidly and easily checked. The unit was developed by the Supply Division of Ferro Corp., Cleveland.

Rolling:

Regulator maintains tension on ultra-thin strip line.

A new tension regulator for ultra-thin metal strip mills utilizes magnetic amplifiers developed by Westinghouse to provide more constant tension on the strip to enable faster acceleration and deceleration, and to give a greater tension range.

In operation, a pattern field in the regulator is excited in proportion to the tension setting made by the operator. A second deflection winding receives a signal indicating the actual tension on the strip. The fields of these two windings are arranged to be in opposition and any difference between the strengths of the pattern and deflection fields results in a signal to the reel motor to increase or decrease the tension. When tension is correct, the two fields cancel each other except for the small steady-state signal required to maintain desired strip tension.

Rolls Deflect Proportionally

The deflection winding receives its intelligence as to tension through an electro-mechanical system. A roll on the mill is arranged such that it is deflected in proportion to the strip tension.

Turn Page

MORE THAN 300 LEADING MANUFACTURERS

are already putting

SKF TYPE "C" BEARINGS

in their products

Here are the trade marks of a few of more than 300 leading manufacturers – companies who want extra bearing performance – who already are using the *improved* SKF Type "C" Spherical Roller Bearing announced less than a year ago.

There are two reasons why

First: They know that for over 40 years, SKF has been *first* with anti-friction developments that *work*.

Second: They obtain, size for size, up to 50% more capacity, 2 to 3½ times increased life with SKF's Type "C" Spherical than they can obtain with any other available design, and at no increase in cost.

7550

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
– *manufacturers of* **SKF** *and* HESS-BRIGHT® *bearings.*

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SKF®
BALL AND ROLLER BEARINGS

This deflection is transmitted through a mechanical system to move a magnetic pick-up unit, whose output is fed to the deflection winding of the magnetic amplifier.

Straightening:

Clean, straighten tube in single operation.

A new rotary straightener which combines three finishing operations into a single production step enables two men to turn out 500 or more 21-to-25-ft lengths of seamless copper tubing every hour around the clock at the Reading Tube Corp. The tubing comes out of the machine straightened to exacting standards and completely cleaned of drawing lubricant. The straightener, built by E. W. Bliss Company's Mackintosh - Hemphill Division, Pittsburgh, Pa., also gives the tubing a light skin temper.

An operator feeds tube lengths into the straightener. Solvent is piped to the top of the work rolls and flows over them and over the tube while the straightener is running. The loosened drawing lubricant and solvent are removed from the straightened tube as it shoots out of the straightener.

According to Reading Tube, a producer of copper and copper alloy tubing, considerable time and labor are saved by eliminating separate cleaning steps. Other advantages of the dual operation are its speed, consistent rounding of tube, and the freedom from jamming provided by its six driven cross rolls.

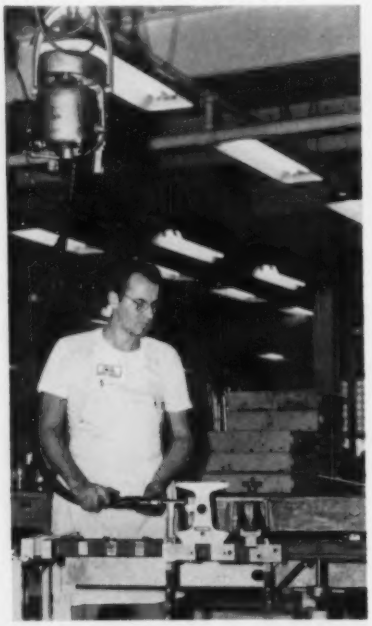
So far, the company has used the new straightener on annealed, ¾ hard, and full hard copper tubing in OD from ¼-in. to 1⅜-in. It will accommodate diameters up to 1¾-in.

Unit turns out over 500 lengths of tubing every hour.

Machining:

Flexible shaft machine simplifies reaming.

The problem of reaming holes 0.813 in. in diam in the mounting hanger on the main base of an accounting machine was solved by International Business Machines Corp. of Endicott, N. Y. To eliminate expensive tooling for this operation, they decided to use a portable flexible shaft machine built by Stow Mfg. Co., Binghamton, N. Y. By using flexible shafting, they have a lightweight multi-speed, suspension-type tool that is easy for the operator to handle and feed into the work. IBM had Stow attach a special switch so that the

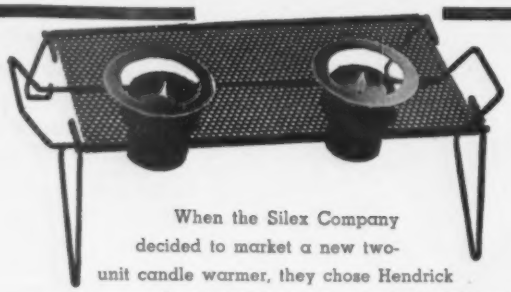


Ample power, little weight for operator to handle.

Silex Selects . . .

Hendrick Perforated Metal

for its new Coffee-Casserole Warmer



When the Silex Company decided to market a new two-unit candle warmer, they chose Hendrick Perforated Metal for the basic fabricating material. For Hendrick Perforated Metal not only helps increase a product's overall attractiveness, but it increases saleability as well. Select from hundreds of attractive designs in commercially rolled metals and gauges to suit your more exacting requirements.

Hendrick
MANUFACTURING COMPANY
37 DUNDAFF ST., CARBONDALE, PA. • *Sales Offices in Principal Cities*
Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

operator could turn the machine off and on at the handpiece.

The flexible shaft machine is designed to operate at four different speeds: 1150, 2100, 3450, and 5750 rpm and is furnished with a 6 ft flexible shaft. The speeds are easily changed since the countershaft pulley is mounted on an eccentric which makes it simple to loosen the belt and shift it on the step pulleys. For other speeds, besides those listed above, different size pulleys can be used (IBM ran the reamer at 750 rpm). The machine is available with either ¾, 1, 1½, 2, or 3 hp motors.

Joining:

Brush technique helpful in aluminum soldering.

A new method of soldering aluminum expected to be of value to the aircraft industry has been Tiltman Langley, research and development consultants, England.

Present soft soldering technique usually relies on heavy and expensive soldering tools mechanically or electronically operated. Solder consisting of 90 pct tin and 10 pct zinc alloy is usually used.

Tiltman Langley has developed a soldering tool in the form of a small brush that is being used for the fluxless soldering of aluminum with any normal solder.

Brush Technique Used

The technique involves the use of an electric hot-plate to raise the work to the required temperature. The solder is applied and the surface is lightly scoured with the brush, made of glass fibres, until the area is effectively overlaid. The surfaces to be joined are placed together and a neat fillet of solder produced by sweeping through the molten solder with the brush.

It has been found that after being raised to a soldering temperature of 250°C. for a short time, the majority of aluminum alloys experience no appreciable loss of mechanical properties.

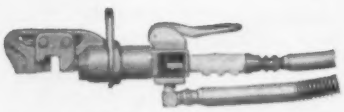
NEW DESIGN

MANCO Hydraulic Guillotine®

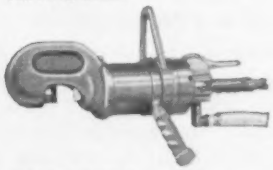
WIRE AND ROD CUTTERS

Big Capacity

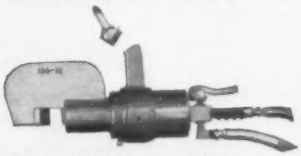
FAST · EASY TO USE



MODEL MC 210 Capacity ½" High speed . . . ½ second per cut for steel rod to ½". Full swivel action.



MODEL MC 35 Capacity 1" Cuts high carbon material including reinforcing rod and heat treated chain to 1" diameter in 1¼ seconds per cut.



MODEL MC 65 Capacity 1¼" Cuts 1¼" diameter steel in 2 seconds per cut. Can be modified to cut 1⅝" diameter aluminum.

Big Time and Money Saver for Rod Mills and Users of Wire and Rod

Ideal for production cutting, trimming off cobbled ends, taking test samples and splitting bundles on docks.

Manco has completely redesigned the Guillotine line of wire and rod cutters now used by major rod mills throughout the world. These new Manco Guillotine units give high efficiency, heavy duty performance, with a 75% slash in tool maintenance costs.

New Interchangeable Blade and Anvil

Interchangeable blade and anvil means wear points can be reversed for virtually double life. Three blade styles for various cutting requirements. There is a new simplified valve design with hardened and ground parts for longer life. Also, new Meehanite piston with large bearing surface and a new piston seal assembly that permits quick replacement.

These Guillotine units powered by Manco Hi-Thrust Electric Hydraulic Pumps

Write for Complete Information

WRITE FOR CATALOG

Important Note: Also ask about trade-in offer on old model 200 HV-2L, 20 HV-1 and 21 HV-2L.

MANCO MFG. CO., Bradley, Illinois IA-ID

Please send:

☐ Catalog of new Guillotine Wire and Rod Cutters.

☐ Trade-in information on Guillotine model(s).....

.....

Name .....

Firm.....

City .....Zone.....State.....

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 89 or 90.

New covering adds to gripper sling versatility

With addition of a new protective covering—plastic or Neoprene—a line of gripper woven wire slings is now recommended for practically any handling operation, even for material which has been milled or machined to a highly finished condition. The protective covering is said to last almost indefinitely under normal use and applied to slings any length or width. It has a negligible effect on sling flexibility and slings so covered can be used in either basket or choke hitch. Inset illustrates how covering penetrates through sling. *Cambridge Wire Cloth Co.*

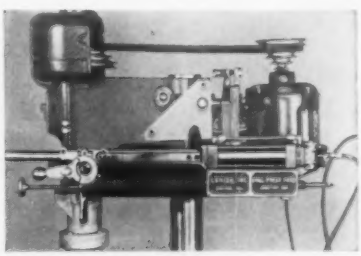
For more data circle No. 28 on postcard, p. 89

Indicator measures swivel table adjustment

Designed to provide accurate control for grinding close tolerance tapers, a dual electric indicator has been developed for measuring swivel table adjustment. The device, applicable to a company line of cylindrical and universal grinding machines, consists of one electrical pick-up unit with zero adjusting knob at each end of the swivel table and a two channel amplifier having a pair of indicating meter elements. *Norton Co.*

For more data circle No. 29 on postcard, p. 89

Feed provides conversion from manual operation



Designed to be attached to drill presses, milling machines or other tools where controlled power is required to rotate a drive shaft, a new, heavy duty drill press feed converts hand operations and controls to semi or completely automatic regulation. The power plant is a reciprocating air motor or air cylinder with built-in control valve. Current models use 2 or 3 in. bore air motors and provide full 360° pinion shaft rotation with 3⅜ in. drill press stroke. For 110 volt or low voltage circuits. *Lehigh, Inc.*

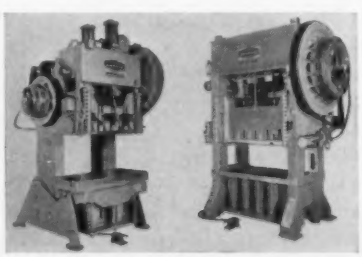
For more data circle No. 30 on postcard, p. 89

Mechanism maintains lathe cutting speed

A new constant surface cutting speed mechanism for a lathe provides automatic variation of drive motor speed to maintain the desired surface cutting speed on each of the various diameters and contours of each workpiece in the run. Surface speeds range from 200 to 1175 fpm and can be maintained over a 4 to 1 diam range. *Monarch Machine Tool Co.*

For more data circle No. 31 on postcard, p. 89

Two new double crank press lines introduced



New double crank press lines, both featuring box-type rams, large bed areas, steel construction, low inertia clutches and electrical controls, have been announced. Shown at left is the 80 ton model with a 52 x 30 bed. It has a 48 x 30 x 3½ bolster plate, 48 x 24 ram face and a bed opening 36 x 6 in. At right is the 60 ton model of the series with a 56 x 22 bed size. It has a bed opening 28 in. x 10 in. and a ram face 40 in. x 22 in. Speed of the backshaft is 303 rev per min. *Johnson Machine & Press Corp.*

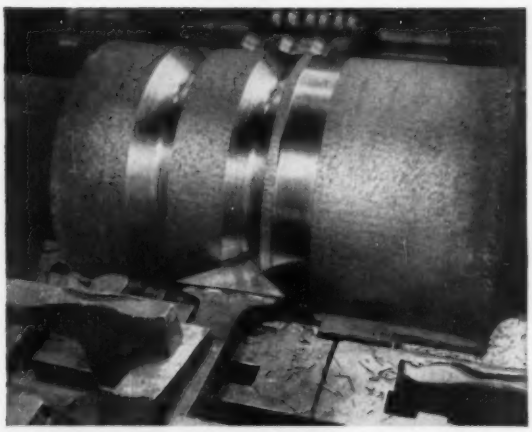
For more data circle No. 32 on postcard, p. 89

TIPS FROM A ROLL MAKER'S NOTEBOOK

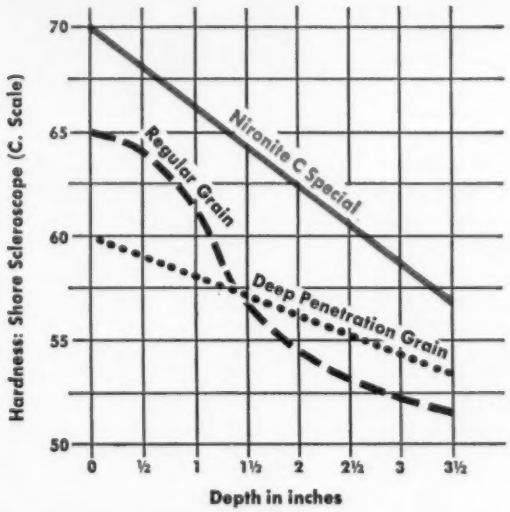
MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

How to pick rolls for bar and billet mills



The crux of the problem—Roughing a pass in a roll for a bar mill.



Generalized curves show how hardness decreases below the surface of three types of roll.

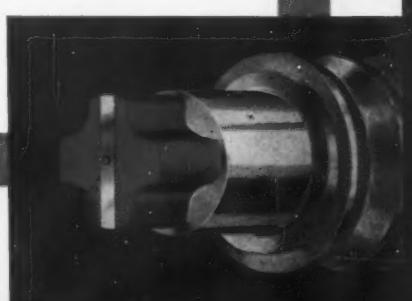
Like all rolls, those for the intermediate and finishing stands of bar and billet mills must possess the best possible balance of strength-vs.-hardness. However, they cannot be chosen on this basis alone.

The problem is complicated by the shape and depth of the passes. Many rolls must be cast plain because of the size of the passes or because of the roll user's need for plain rolls which may be turned for any section. Hence, large amounts of metal must be removed during turning.

As a result the metallurgist strives for two prime objectives in rolls for these applications. They are (1) the greatest possible depth of hardness and (2) fine grain structure to provide smoothness of work surface at the bottom of the passes.

A practical solution—The Nironite C Special roll is the answer that Mack-Hemp has developed to meet this problem. In this indefinite chill nickel-chromium alloy iron roll, depth of penetration is achieved by careful control of the carbon content. This results in deep penetration as well as less and finer graphite in the solidified iron. Hardness decreases very gradually as distance from the surface increases (see graph at left). Thus, this manipulation of carbon provides excellent wear resistance even at the bottom of deep passes. And the low graphite content which is assured by this special composition provides excellent surface condition at depths well below the original surface.

Nironite C Special rolls are only one example of the way Mack-Hemp can combine metallurgical research with nearly five generations' experience in the "art" of roll making to improve the performance of modern rolling mills. For help with your special rolling problem, write us today.



MACKINTOSH-HEMPHILL

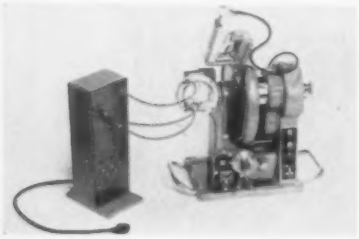
You get more tonnage from the rolls with the Striped Red Wabblers

DIVISION OF **E. W. BLISS COMPANY**

Welder for hardfacing on irregularly-shaped parts

Designed specifically for manganese steel and hardfacing work on irregularly-shaped parts, a portable welder has been made available. The unit, mounted on large industrial casters and displacing the amount of space of an average television set, is designed to plug into conventional ac or dc welding units by a single cable. In operation the welder produces a visible arc which fuses metal and flux upon the metal being welded or built up. Fluxes available include manganese steel, martensitic iron and martensitic steel. *American Brake Shoe Co.*

For more data circle No. 33 on postcard, p. 89



Device imparts motions to specimens being X-rayed

Designed for use with an X-ray diffractometer for grain orientation studies in metallurgical and other fields, a new pole figure device can import one, two or three motions to a specimen undergoing X-ray exposure. The motions include: rotation about the axis vertical to the specimen surface, rotation about the axis parallel to the specimen surface, and oscillation in plane of specimen surface. *North American Philips Co., Inc.*

For more data circle No. 34 on postcard, p. 89

Fork truck attachment provides palletless handling

A combination fork truck attachment for palletless handling of equipment in crates or in drum-type fiber cartons has been developed. The device combines the manufacturer's finger lift mechanism with a special addition for handling fiber cartons. The new addition to the attachment includes two vertical swiveled plates, called carton lip plates, mounted above the fingers. These are used to pick up the type of container known as cap-and-tube or drum type. Steel strapping is run around this cap to hold it in place. The plates of the new attachment slip between the wall and the fold for lifting. The arrangement is strong enough so that four cartons 2-high, side-by-side can be lifted at once. Device enables one truck, with one attachment, to handle either crates or drum-type cartons. *Baker-Raulang Co.*

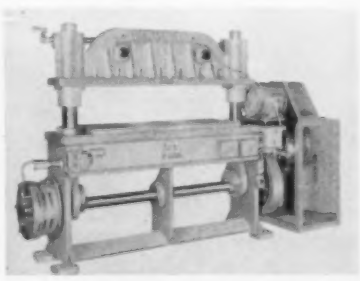
For more data circle No. 35 on postcard, p. 89

Versatile tracer measures 85 pct of all surfaces

An extra versatile Profilometer tracer for measuring surface roughness is reported to handle 85 pct of all the varied surfaces produced by industry. This versatility is said to be made possible by having the tracer point at the end of a projecting beam and by three interchangeable skidmounts that support the tracer on the work surface. Three types of skidmounts are available. One is used for mechanical tracing with a Mototrace unit, while two are for manual operation but may be also used for Mototrace operation. *Micrometrical Mfg. Co.*

For more data circle No. 36 on postcard, p. 89

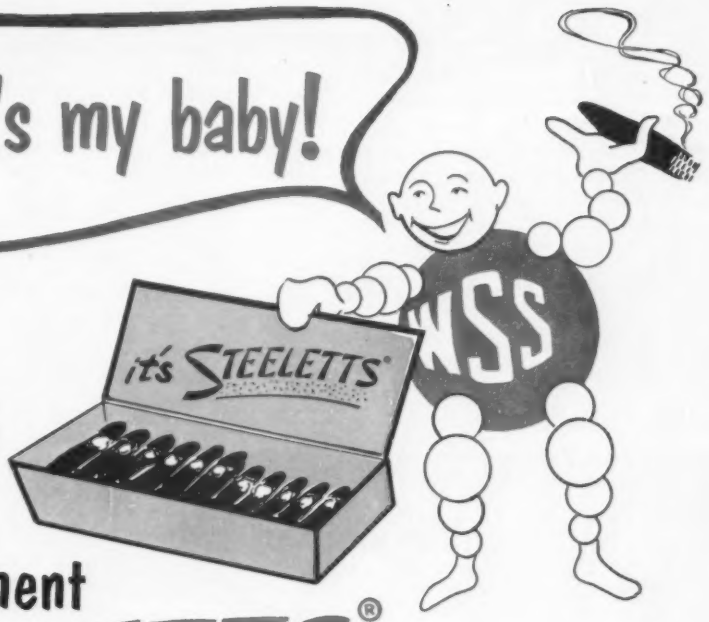
Features permit closer punch press control



An air clutch, air brake and low temperature-rise motor designed to permit closer control of punch press operations are available on a new line of punch presses. The air clutch lets operator set dies by inching the ram into any predetermined position, where it is held by the automatic application of an air brake synchronized with the clutch. Air brake is free from drag, reducing heating and power consumption. Cool-running electric motor provides controlled power. This motor has an extra, turbine-type fan on the shaft for increased circulation. *Acec Electric Corp.*

For more data circle No. 37 on postcard, p. 89

Yes Sir, that's my baby!



WHEELABRATOR'S Newest abrasive development

STEELETTS®

for maximum economy in grit blasting

Just born . . . Steeletts . . . a high hardness grit with the life of steel. Free from the brittle carbides that cause rapid breakdown of chilled iron abrasives, each particle of Steeletts has a longer, more productive working life span than any other grit. This means maximum economy.

Steeletts do not chip away on each impact but retain their size and shape longer than any other grit, thereby increasing the impact power of each pellet while lengthening the life of the abrasive. This adds up to maximum economy.

Steeletts are in the same hardness range as chilled iron. This hardness pinpoints the impact of the blast, resulting in speedy removal of even the hardest alloy steel scale and fast and deep etching of the hardest surface. This, too, contributes to maximum economy.

Steeletts retain their basic grit shape when used but the sharp edges become dulled. The grit shape imparts the matte finish essential for grit-blasted surfaces but the dull edges minimize the problem of embedment and reduce the wear and maintenance problems caused by the sharp fracturing edges of other grits. This, too, adds up to maximum economy.

For more information on Steeletts, send today for your copy of Bulletin 901-D. It's filled with valuable information on this new, long-life, high-speed, low-cost abrasive development.

WHEELABRATOR CORPORATION
(Formerly American Wheelabrator & Equipment Corp.)

World's Largest Builders of Airless Blast Equipment and Steel Abrasives

510 S. Byrkit Street, Mishawaka, Indiana

Bender

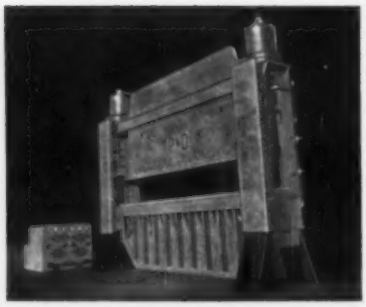
Now offered as standard equipment, a new serpentine coil bender produces continuous coils from a single length of tubing without removing the tubing from the machine. The one-piece coils can be produced in minutes without any welding. Unit bends annealed ferrous and non-ferrous tubing from ¼ in. to 1 in. OD. *Leonard Precision Products Co.*

For more data circle No. 38 on postcard, p. 89

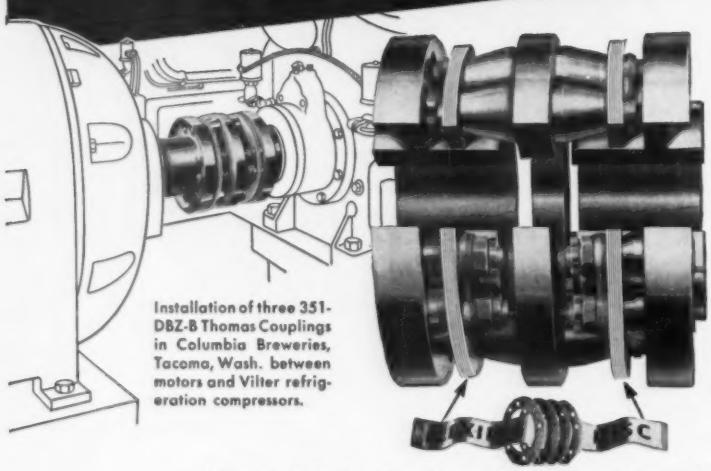
Hydraulic press

A new 1000 ton hydraulic press has completely open end housings which permit passage of work through the press, up to the over-all length of the pressing surface. In addition, all units are furnished with a sensitive ram-leveling device, as well as a ram tilt feature. Unit is compact in relation to its rating, with over-all length of 26 ft, 1 in.; overall width of only 4 ft, 6 in., and over-all height from the floor of 16 ft. 5½ in. Open height is 33 in. and closed height is 17 in. *Philips & Davies, Inc.*

For more data circle No. 39 on postcard, p. 89



THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

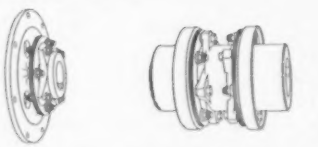


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

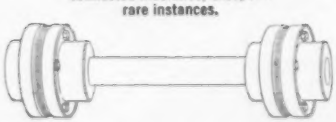
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

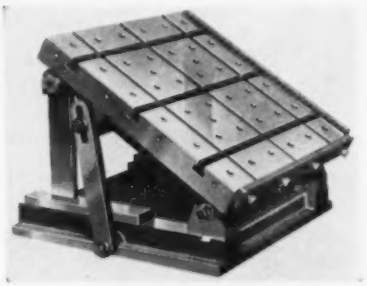


Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

Sine plates, tables

A patented "permaflat" swivel block has been added to a company line of angular tooling equipment. Designed to insure extended service life for the equipment and the precision gage blocks used with it, the swivel block is used on the company's heavy duty sine plates for angular machining, on a magnetic sine table for angular grinding and on an inspection sine plate. *Omer E. Robbins Co.*



For more data circle No. 40 on postcard, p. 89

Piloted taps and tap kits

A line of high speed ground thread piloted taps and piloted tap kits are now being offered by one manufacturer as standard stock items. *Threadwell Tap & Die Co.*

For more data circle No. 41 on postcard, p. 89

JUNIOR PUTS THE CHIEF "ON ICE"

(his goal is control!)

CHIEF KEOKUK:
"Ice slippery, but Junior more so!"

CHIEF KEOKUK JR.
"Hockey game matter of control . . . feet, hands, puck and Big Chief, too!"

PRINCESS WENATCHEE:
"Junior control 'um Chief and game. Run up heap big score."

You'll score high too when you control cost and quality with Keokuk Silvery Pig Iron . . . the superior form of silicon introduction for foundries and steel plants. Car for car, pig for pig . . . its uniformity never varies. Handle Keokuk by magnet . . . charge by weight (or count the piglets for equal accuracy). Aluminum producers score equally high with Keokuk Silicon Metal. Let us send you complete information.

When you think of SILICON think of KEOKUK!

KEOKUK ELECTRO-METALS COMPANY KEOKUK, IOWA

Wenatchee Division, Wenatchee, Washington

SALES AGENT: MILLER AND COMPANY

332 South Michigan Ave., Chicago 4, Illinois

3504 Carew Tower, Cincinnati 2, Ohio

8230 Forsyth Blvd., St. Louis 24, Missouri

Keokuk Silvery is available in 60 and 30 lb. pigs and 12½ lb. piglets, in regular analysis or alloyed with other elements.

Using the Sheffield-Cavitron Ultrasonic Machine Tool to dice germanium in the mass production of transistors. The tool itself consists of 271 pieces of Superior's 18-gage Type 304 needle tubing, cut to 7/8" lengths and silver brazed into a single tool, permitting tolerances as fine as .0005".

NEW ULTRASONIC MACHINE TOOL USES TUBING TO CUT HARDEST, MOST BRITTLE MATERIALS KNOWN

a new application for Superior Tubing

Ultrasonic vibrations do the cutting with this new machine tool, invented and developed by the Cavitron Equipment Corporation, Long Island City, N.Y. In the Cavitron process, a tool is used which has the precise shape of the cavity desired. Finely divided abrasive particles suspended in water are flowed continuously across the work. No movement or vibration is visible when the machine is switched on, although the tool tip vibrates 20,000 times a second through a stroke of .0035". The vibrating tip activates the suspended particles, and microscopic chips are gently excavated without heat, noise or vibration. The tool sinks swiftly into the work under slight pressure, forming a cut or cavity of exactly the same shape as the tip.

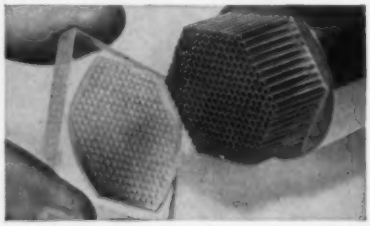
Tools made of Superior tubing save considerable cutting time on relatively large areas. Furthermore, the slender walls (.005" thick) minimize waste of valuable raw material. Cavitron engineers first used carbon tubing for this purpose, but in consultation with Superior engineers switched to AISI Type 304. This material has twice the life of carbon tubing, with much greater resistance to wear. Most important, it resists warping at the silver brazing temperatures needed to join the tubes together.

Your files should contain Superior Bulletin No. 40. It lists over 55 types of available material, including the stainless steels, with valuable selection and application data. Write for your free copy today. SUPERIOR TUBE COMPANY, 2004 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Co., 5710 Smithway St., Los Angeles 22, California.

All analyses available in .010" to 5/8" OD; certain analyses in light walls up to 2 1/2" OD

Superior Tube
The big name in small tubing

Superior tubes are cut into 2" lengths and silver brazed into a 6-sided tool, which is then cut in half and two complete honeycomblike tools formed—each 7/8" deep. Similar tools are used to cut precision jewel bearings.



Closeup of tool and work shown in top picture. The Cavitron makes it possible to cut and drill intricate shapes in materials which, because of their frangibility or sensitivity to sudden temperature changes, would be impossible to work on a production basis.

The Iron Age SUMMARY . . .

Automotive cutbacks bring no relief to sizzling steel market . . . No easing seen for first half . . . Plate and structural outlook discouraging.

Where's The Steel? . . . All the razzmatazz over cutbacks in auto production is little comfort to steel users who find it tough to get what they need to meet production schedules.

Many who rushed order in hand to steel company offices came away disappointed. They learned that the auto slowdown will bring little or no relief to the steel shortage for several months—if then.

If anything, the news from Detroit brought to the surface the real underlying strength of the steel market: that it is based on demand from virtually all industry rather than on one particular industry, such as automotive.

Many hard-pressed consumers have been hoping against hope that automotive demand would weaken and give them a chance to squeeze more tonnage from the mills. When the "break" came, they all rushed in—and most came away empty-handed.

Autos Slow To Cancel . . . THE IRON AGE has learned that the auto producers themselves are uncertain whether their first quarter sales will be off 5 or 20 pct from a year ago. This uncertainty makes them go slow in their cancellation of steel orders.

Apart from that, there is a possibility that the auto makers may try to build their inventories to 45 days as a hedge against a possible strike in steel. Present inventories are about 30 days, with some types of bars and hot-rolled sheets a bit on the low side.

If there is any real relief in the cards for steel in '56, it's unlikely to show up before mid-year. Orders continue to run ahead of production despite increased steel capacity. Order backlogs are still heavy. Deliveries on popular products are extended. Steel capacity expansion now in the works will not make itself felt for months.

Other strengthening factors between now and mid-year include (1) uncertain steel labor outlook, (2) probability of price increases, (3) the growing realization that business is not likely to fall apart at the seams soon, and (4) the knowledge that wear and tear on steel mill equipment is bound to be reflected in lower production rates.

Tough Scramble . . . The scramble for steel affects just about all products. But from a supply standpoint, the outlook for plates and structurals is the most desperate. Construction projects, including expansion plans of the steel industry, are threatened with delays for want of structurals. Railroads, linepipe made from plate, and construction are biggest users of plate.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,437	2,437	2,398	2,052
Ingot Index				
(1947-1949=100)	151.7	151.7	149.1	127.5
Operating Rates				
Chicago	98.5	98.5*	99.0	87.5
Pittsburgh	101.0	103.0*	102.0	82.0
Philadelphia	100.0	102.0	105.0	76.0
Valley	98.0	99.0	95.0	85.0
West	101.0	102.0*	99.0	90.0
Detroit	106.0	103.0	92.0	91.0
Buffalo	105.0	105.0	105.0	101.0
Cleveland	103.0	102.0*	96.0	83.0
Birmingham	97.0	96.0	94.0	74.0
S. Ohio River	93.5	88.0*	90.2	95.5
Wheeling	101.0	102.0*	101.0	100.0
St. Louis	99.0	99.0	105.0	87.5
Northeast	88.0	85.0*	85.0	45.0
Aggregate	99.0	99.0	99.4	85.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$50.83	$53.17	$53.00	$35.50
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	23.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.80	15.80	15.30	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	104.00	104.50	109.375	88.50
Zinc, E. St. Louis	13.50	13.50	13.00	11.50

Here's A Forecast For '56

U.S. Steel executive cites steel usage increases and decreases by industries . . . Expects higher level of inventories by year's end . . . Says planned capacity boosts won't help now.

◆ THERE WILL BE some changes in the pattern of steel demand in the months ahead. But there will be little overall easing as some industries increase their steel requirements to take up any slack from other directions.

According to David F. Austin, executive vice-president, U. S. Steel Corp., private construction dollar outlays will total about the same this year as they did in 1955. On the other hand, business spending for plant and equipment will show a substantial gain in 1956, a rise already being foreshadowed by a steady spurt in new machinery orders.

Increases over 1955 are expected in steel consumption by the construction, machinery, shipbuilding, oil and gas, and railroad industries. Railroads will show the sharpest rise in steel usage from the low level which prevailed during most of last year.

Decreases in use of steel compared with 1955 can be expected in the automobile industry, appliances, and agriculture. None of these expected changes will be sizable, Mr. Austin points out, with the exception of the decline in auto production. Here, he notes, it's expected the reduction in steel usage will come to around 10 to 15 pct.

This doesn't mean, however, that total finished steel consumption will fall below that of last year. In effect, a moderate buildup of finished steel inventories by most consumers means that about as much steel will be bought this year as last.

On this point, Mr. Austin says, "the sort of inventory accumulation which we envisage will bring steel inventories by the end of this year slightly below 1953.

Railroad freight car builders have a whopping total of new car orders to fill this year, says the Assn. of American Railroads.

On January 1, some 147,320 cars were contracted for and undelivered. This represents an increase of about 38,000 units during December. A year earlier, on January 1, 1955, only 15,317 cars were on order.

Hot-dipped aluminum-clad steel wire is now being produced in a new line recently installed at the American Works of U. S. Steel's American Steel & Wire Div., Cleveland.

The 16-strand, full-scale production unit is the Division's first commercial installation for manufacturing the new product. The new facilities can turn out aluminum clad wire in sizes ranging from 6 to 18 gage in either 16-in. or 22-in. diameter coils.

Allegheny Ludlum Steel Corp. announced price increases on cold-finished stainless bar and wire and hot-rolled stainless wire rods, affecting only products ½ in. and under.

SHEETS AND STRIP . . . Farm equipment demand for hot-rolled sheet is easing off slightly in **Chicago.** Warehouses and appliance makers, however, are still hot after all the hot rolled sheet they can get. **Local** mills say they're already sold out on second quarter sheet orders. They report little letup in demand as yet from automotive producers. Second quarter schedules have been opened for cold-rolled sheet producers in **Cleveland.** Orders are being filled cautiously, however, pending announcement of automakers' schedules. Shipments of cold-rolled sheet are largely current for one area mill, and only a few weeks off for others in the area. There's still heavy hot-rolled sheet demand in **Detroit.** Indications are that cold-rolled sheet inventories for auto producers are just about up to normal. **Eastern** producers, in most cases, haven't opened order books for second quarter yet.

STAINLESS . . . One Northern Ohio steel producer expects to receive substantial orders for stainless steel for tops for the new $8,500 Cadillac Brougham going into production in August in Detroit. The new Cadillac dream car is expected to hit the market before year's end as an answer to Ford's Continental.

GALVANIZED . . . **Chicago** producers look for continuing heavy order demands for this product despite reports of earlier consumer buildups. They cite the fact that farm demand for galvanized isn't in yet.

BARS . . . Fairly heavy cold-finished bar inventories are on hand in **Chicago** warehouses, and producers expect to be current on hot-rolled bar deliveries by the end of first quarter. Demand for both items, however, continues strong. Automakers are still trying to build up inventory on forging bars and 1-in. rounds in **Detroit. West Coast** mills report a slight cutback in bar purchases by automakers. Other consumers, however, are picking up the slack.

PLATE . . . Mounting demand from Midwest linepipe fabricators indicates an even heavier market for plate in **Chicago** district in the months ahead. Producers are worried as to whether delivery carryovers can be wiped out in first quarter.

STRUCTURALS . . . Demand for this product is just as heavy as for plate in virtually every market area. About the only place they can be had in **Pittsburgh** is through brokers at premium prices. On the **West Coast,** mills are sold out to mid-May, are now opening up order books for June.

Purchasing Agent's Checklist

STEEL: Don't look for change in the warehouse picture ..... p. 29

MACHINE TOOLS: New defense policy makes more available p. 55

NUT RUNNERS: New torsion bars control torque ..... p. 76

STAMPING: Permanent dies pare costs ..... p. 82

Comparison of Prices

(Effective Jan. 24, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Jan. 24 1956	Jan. 17 1956	Dec. 28 1955	Jan. 25 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled Sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

	Jan. 24 1956	Jan. 17 1956	Dec. 28 1955	Jan. 25 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia.	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig Iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$50.50	$54.50*	$53.50	$36.50
No. 1 steel, Phila. area	52.50	55.50	54.50	35.50
No. 1 steel, Chicago	49.50	49.50	51.00	34.50
No. 1 bundles, Detroit	47.50	47.50*	45.50	27.50
Low phos., Youngstown	*55.50*	56.50	55.00	36.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	43.50
No. 1 mach'y cast, Philadel'a	57.50	57.50	56.50	43.50
No. 1 mach'y cast, Chicago	*54.50*	55.00	56.50	45.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$50.83	$53.17	$53.00	$35.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	43.00	43.00	43.00	30.00
Copper, Lake, Conn.	43.00	43.00	43.00	30.00
Tin, Straits, New York	*104.00*†	104.50	109.375	88.50
Zinc, East St. Louis	13.50	13.50	13.00	11.50
Lead, St. Louis	*15.80*	15.80	15.30	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50
† Tentative. ‡ Average. * Revised.				

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. *Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron Buffalo, *H1*, $68.75; Jackson, *J1, G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

←To identify producers, see Key on P. 120→

Product	301	302	303	304	316	321	347	410	416	420
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	25.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	50.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa. *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bar: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown; *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5.*

Market Takes New Drop

Steelmaking grades take big dip in Pittsburgh and Philadelphia . . . Prices also slump in most markets . . . Reaction to record high levels prompts sudden change.

Bulletin — Last-minute purchases by a large consumer dropped prices in Pittsburgh and Philadelphia. New prices are reflected in scrap price tables. Iron Age composite dropped to $50.83.

No. 1 heavy melting dropped $4 in Pittsburgh, $3 in Philadelphia.

Cleveland and the Valley prices declined on the basis of a major sale of dealer material in Cleveland. This is the second decline in two weeks.

Absence of domestic activity and an apparent trend toward weakness in export, weakened Philadelphia and New York. An expected momentary purchase by a large consumer in the Philadelphia area is looked for by brokers and dealers as a test of current price levels.

Pittsburgh activity in steelmaking grades is practically nil, and a large consumer is offering to buy at prices considerably below the prevailing level. Meanwhile, No. 2 bundles slipped slightly on the basis of broker-dealer activity.

On the basis of the latest downturn in the Chicago and Philadelphia markets, THE IRON AGE steel scrap composite price declined $1 to $50.83.

Pittsburgh . . . Consumers are determined to put current prices to a test. Activity in top steelmaking grades is virtually nil, and a large user is offering to buy at prices considerably below the prevailing level. As of early this week, no deal apparently had been made. Meanwhile, No. 2 bundles slipped slightly on the basis of broker-dealer activity. Turnings are off $2 a ton on basis of the latest purchase of machine shop turnings.

Chicago . . . The local market continued to slide, with broker buying prices still falling, mills being offered additional tonnages at reduced prices, and an anticipated purchase in the wind at a reduced price. Turnings seem particularly hard hit, though the break now affects steel making, electric furnace, and railroad grades. Foundry grades exhibit a slightly stronger price, and foundry activity continues relatively high. A leveling at current prices is expected by the end of this week.

Philadelphia . . . Steelmaking grades were off $1 per ton this week in the absence of domestic activity and an apparent trend toward weakness in export. A leading consumer is understood to be preparing to enter the market momentarily, and the pressure was on brokers and dealers to sell at lower prices.

New York . . . Steelmaking grades are off $1.50-$3 in this area in absence of new domestic business and a slackening in exports. Brokers are hoping for hefty February buying from domestic mills and are fearful of pressure for lower prices on the new ordering. But they insist that substantial tonnages of scrap can only be supplied if prices return to the levels of the past few weeks.

Detroit . . . Uncertainty is pervading the scrap market in Detroit, but both brokers and dealers agree the market is softer. Expectations are that the February auto lists that close this week will be down $2 to $3. The smaller tonnages of scrap available because of auto cutbacks will probably prevent the market from dropping.

Cleveland . . . Cleveland and the Valley steel making prices dropped $1.50 on the basis of a major sale of dealer material in Cleveland. This was the second decline in two weeks, indicating a leveling off period and came just as monthly industrial lists were drawing near. The biggest item of interest locally is how much local automotive lists will go for this week. Only one of three lists released to brokers so far is 4200 tons or about 15 pct under normal.

Birmingham . . . The electric furnace and cast scrap market continues active in this district, but there is practically no buying of open hearth scrap at this time. Dealers, however, are still busy filling orders bought last month. Prices are holding firm despite the fact that scrap is beginning to pile up to some extent. Brokers still see a weakness in the market, but say prices may hold at present levels for a while.

St. Louis . . . A Mopac list of 181 carloads of scrap which closed last week includes 100 cars of No. 1 RR hvy melting sold at a reduction of $4 per ton. Rail, random length, the only other item affected, dropped $1 per ton. Other items remain unchanged in price. Shipments for the week, which were on the basis of orders placed before the recent declines, were equal to the melt. Weather conditions have not affected noticeably the collection or processing of scrap.

Cincinnati . . . Price dropped another $1 on steelmaking grades as a local mill remains out of the market and upriver demand has dropped off. Present prices are about bottom for time being and dealers continue pessimistic because of lack of new orders. Brokers are filling old orders at reduced prices thus raising some profit margins.

Buffalo . . . Softening in the scrap market has dropped prices of No. 1 and No. 2 heavy melting, and No. 1 and No. 2 bundles $1 a ton. A considerable amount of scrap in small lots has moved at these slightly lower prices. There's a slight strengthening in the cast market due to short quantities. This has upped the price of No. 1 machinery cast and No. 1 cupola cast $1 a ton.

Boston . . . No. 1 heavy melting has moved up $1 to $48. Other prices are unchanged. Picture has been scrambled by a railroad embargo on scrap shipments to the docks. Domestic activity continues steady with eastern Pennsylvania and area mills buying.

West Coast . . . The foreign exporting pace is easing off, giving mills a chance to get all the scrap they need. But mills aren't stockpiling. What they get goes into maintaining their over-100-pct operating rate. Exporters claim high charter rates are dampening their enthusiasm.

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LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

Scrap Prices *(Effective Jan. 24, 1956)*

Pittsburgh

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	50.00 to 51.00
No. 2 bundles	42.00 to 43.00
Machine shop turn	35.00 to 36.00
Mixed bor. and ms. turn	35.00 to 36.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	41.00 to 42.00
Low phos. punch'gs plate	60.00 to 61.00
Heavy turnings	48.00 to 49.00
No. 1 RR. hvy. melting	58.00 to 59.00
Scrap rails, random lgth.	64.00 to 65.00
Rails 2 ft and under	69.00 to 70.00
RR. steel wheels	62.00 to 63.00
RR. spring steel	62.00 to 63.00
RR. couplers and knuckles	62.00 to 63.00
No. 1 machinery cast	55.00 to 56.00
Cupola cast	49.00 to 50.00
Heavy breakable cast	45.00 to 46.00

Chicago

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 factory bundles	52.00 to 53.00
No. 1 dealers' bundles	49.00 to 50.00
No. 2 dealers' bundles	38.00 to 39.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast Iron borings	29.00 to 30.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'gs plate	51.00 to 52.00
Low phos. 3 ft and under	54.00 to 55.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth	61.00 to 62.00
Rerolling rails	70.00 to 71.00
Rails 2 ft and under	66.00 to 67.00
Locomotive tires, cut	56.00 to 57.00
Cut bolsters & side frames	57.00 to 58.00
Angles and splice bars	65.00 to 66.00
RR. steel car axles	66.00 to 67.00
RR. couplers and knuckles	57.00 to 58.00
No. 1 machinery cast	54.00 to 55.00
Cupola cast	50.00 to 51.00
Heavy breakable cast	42.00 to 43.00
Cast iron brake shoes	39.00 to 40.00
Cast iron car wheels	48.00 to 49.00
Malleable	61.00 to 62.00
Stove plate	41.00 to 42.00

Philadelphia Area

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	52.00 to 53.00
No. 2 bundles	43.00 to 44.00
Machine shop turn.	37.00 to 38.00
Mixed bor. short turn.	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Shoveling turnings	39.50 to 40.50
Clean cast chem. borings	42.00 to 43.00
Low phos. 5 ft and under	56.50 to 57.50
Low phos. 2 ft and under	58.00 to 59.00
Low phos. punch'gs	58.00 to 59.00
Elec. furnace bundles	55.00 to 56.00
Heavy turnings	50.00 to 51.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
Rails 18 in. and under	65.00 to 67.00
Cupola cast	52.00 to 53.00
Heavy breakable cast	53.00 to 54.00
Cast iron car wheels	58.00 to 59.00
Malleable	66.50 to 67.50
Unstripped motor blocks	39.00 to 40.00
No. 1 machinery cast	57.00 to 58.00

Cleveland

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	41.50 to 42.50
No. 1 bundles	51.00 to 52.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	51.00 to 52.00
Machine shop turn.	30.50 to 31.50
Mixed bor. and turn.	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.50 to 35.50
Cut struct'r'l & plates, 2 ft & under	61.00 to 62.00
Drop forge flashings	52.00 to 53.00
Low phos. punch'gs, plate	52.00 to 53.00
Foundry steel, 2 ft & under	55.00 to 56.00
No. 1 RR. heavy melting	51.00 to 52.00
Rails 2 ft and under	71.00 to 72.00
Rails 18 in. and under	72.00 to 73.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	34.00 to 35.00
Railroad cast	57.00 to 58.00
No. 1 machinery cast	56.00 to 57.00
Stove plate	53.00 to 54.00
Malleable	58.00 to 59.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	32.00 to 33.00
Shoveling turnings	36.50 to 37.50
Cast iron borings	36.50 to 37.50
Low phos. plate	55.00 to 56.00

Buffalo

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 busheling	48.00 to 49.00
No. 1 bundles	48.00 to 49.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	54.00 to 55.00
Scrap rails, random lgth.	51.00 to 52.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles, openhearth	47.00 to 48.00
No. 2 bundles	35.00 to 36.00
New busheling	47.00 to 48.00
Drop forge flashings	46.50 to 47.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. punch'gs, plate	50.00 to 51.00
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	39.00 to 40.00
Stove plate	40.00 to 41.00
Automotive cast	50.00 to 51.00

St. Louis

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	43.00 to 44.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	28.00 to 29.00
Cast iron borings	30.00 to 31.00
Shoveling turnings	30.00 to 31.00
No. 1 RR. hvy. melting	49.00 to 50.00
Rails, random lengths	58.50 to 59.50
Rails, 18 in. and under	65.00 to 66.00
Locomotive tires uncut	55.50 to 56.50
Angles and splice bars	58.00 to 59.00
Std. steel car axles	60.00 to 61.00
RR. specialties	57.00 to 58.00
Cupola cast	49.00 to 50.00
Heavy breakable cast	40.00 to 41.00
Cast iron brake shoes	38.00 to 39.00
Stove plate	40.00 to 41.00
Cast iron car wheels	47.00 to 48.00
Rerolling rails	63.00 to 64.00
Malleable	50.00 to 51.00
Unstripped motor blocks	40.00 to 41.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	47.00 to 48.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	47.00 to 48.00
Elec. furnace, 3 ft & under	50.00 to 51.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and short turn.	27.00 to 28.00
Shoveling turnings	29.50 to 30.00
Clean cast chem. borings	28.00 to 29.00
No. 1 machinery cast	48.00 to 49.00
Mixed cupola cast	42.50 to 43.50
Heavy breakable cast	42.00 to 42.50
Stove plate	38.00 to 39.00
Unstripped motor blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	42.00 to 43.00
No. 2 bundles	35.50 to 36.50
Machine shop turn	28.00 to 29.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	49.00 to 50.00
Mixed yard cast	46.00 to 47.00
Charging box cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	19.00 to 20.00
Electric furnace bundles	48.00 to 49.00
Bar crops and plate	54.00 to 55.00
Structural and plate, 2 ft	54.00 to 55.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	59.00 to 60.00
Rails, 18 in. and under	64.00 to 65.00
Angles & splice bars	61.00 to 62.00
Rerolling rails	64.00 to 65.00
No. 1 cupola cast	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	39.00 to 40.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. & under	56.00 to 57.00
Rails, random lengths	61.00 to 62.00
Rails, 18 in. and under	67.00 to 68.00
No. 1 cupola cast	46.00 to 47.00
Hvy. breakable cast	44.00 to 45.00
Drop broken cast	55.50 to 56.50

San Francisco

No. 1 hvy. melting	....	$44.00
No. 2 hvy. melting	....	42.00
No. 1 bundles	....	43.00
No. 2 bundles	....	38.00
No. 3 bundles	....	29.00
Machine stop turn.	....	23.00
Cast iron borings	....	23.00
No. 1 RR. hvy. melting	....	44.00
No. 1 cupola cast	....	50.00

Los Angeles

No. 1 hvy. melting	....	$42.00
No. 2 hvy. melting	....	38.00
No. 1 bundles	....	41.00
No. 2 bundles	....	33.00
No. 3 bundles	....	29.00
Machine shop turn.	....	20.00
Shoveling turnings	....	23.00
Cast iron borings	....	20.00
Elec. furn. 1 ft and under	....	42.00
No. 1 RR. hvy. melting	....	42.00
No. 1 cupola cast	....	48.00

Seattle

No. 1 hvy. melting	....	$48.00
No. 2 hvy. melting	....	44.00
No. 2 bundles	....	38.00
No. 3 bundles	....	30.00
No. 1 cupola cast	....	45.00
Mixed yard cast	....	45.00

Hamilton, Ont.

No. 1 hvy. melting	....	$45.50
No. 2 hvy. melting	....	41.50
No. 1 bundles	....	45.50
No. 2 bundles	....	38.00
Mixed steel scrap	....	39.50
Bushelings	....	35.50
Bush., new fact., prep'd	....	43.50
Bush., new fact., unprep'd	....	39.50
Machine shop turn.	....	18.00
Short steel turn.	....	27.50
Mixed bor. and turn.	$16.00 to	19.00
Rails, rerolling	....	53.50
Cast scrap	42.00 to	45.00

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Copper Takes Strike Two

Laurel Hill Refinery strike is second of the year in copper industry . . . Total of 37,000 tons production lost in both . . . Inventories not yet critical.

◆ IF IT'S NOT in the mines, it's in the refineries. If it's not in Chile it's in the U. S. Strikes seem to be an occupational hazard in the copper industry.

The Laurel Hill Refinery of the Phelps Dodge Copper Corp. was still idled early this week by a strike that had been expected to end in a few days. The workers walked out on Jan. 10.

The loss to industry has been in the neighborhood of 6000 tons of refined copper.

Added to the 31,000 tons lost by lack of activity in the mines of Chile during the end of 1955 and beginning of 1956, it means a loss of approximately 37,000 tons production in a period of just about one month.

Mills which had managed to build up some inventory are now tapping the till rather than pay premium prices. In general the Laurel Hill, N. Y., strike has not yet put fabricators in a serious situation. But purchasing agents are getting the jitters.

No one seems to know exactly what the strike is about. Like the stoppage in Chile the men do not seem to have a grievance against management. This time it seems to be an inter-union battle for control.

If the strike drags on for much longer, 10 days or more, fabricators who have been staying off the market may be forced to come in and pay premiums in sharp competition for available copper. It could mean a round of price increases, from producers' copper right down the line through mill products.

Any serious repercussions which may emanate from either strike will be felt primarily in the second quarter. The trade feels that if the Laurel Hill plant goes back into full production within a few days, and industry-wide full production is maintained for several months the situation would be eased if not completely offset.

Eyes are beginning to turn toward June 30, when negotiations are set to begin between labor and the major U. S. producers. An easier market at that time would certainly strengthen possibilities of immediate agreement and continued production.

ALUMINUM . . . Olin Mathieson will bow into the field of primary aluminum production as the first group to burn coal mined directly on its own site, for power. As a result, about 25 pct of the initial investment of $120 million will be spent for power facilities.

The alumina plant, reduction plant, and rolling mill will be on the Ohio River near Clarington, O. Power plant will be slightly upstream in W. Va. It will be engineered and built by General Gas & Electric on a major coal mine to be built and operated by Pittsburgh Consolidation Coal Co. Power will come from two units of 225,000 kws each. One unit will be owned by a subsidiary of American Gas & Electric and the other by a joint subsidiary of Olin Mathieson and Pittsburgh Consolidation Coal.

The alumina plant is planned for a capacity of 230,000 tons per year. The primary aluminum plant will turn out 60,000 tons annually. Since only half of the alumina production will be required within the Olin Mathieson organization, 115,000 tons per year will be put on the market.

Kaiser Aluminum & Chemical Corp. also got into the expansion act with the announcement that it would build an $8 million caustic-chlorine plant adjacent to the new alumina plant at Gramercy, La. Caustic soda is a key ingredient in the refining of bauxite. This will be the first such plant to be owned by a U. S. producer as part of its integrated operation. The basic material in the new plant will be common salt.

GOVERNMENT . . . Mining firms, metals and minerals processing companies are asked by the Government to supply information on operating stocks of copper and aluminum, and on maintenance and repair. A survey of the firms is being conducted by the Office of Minerals Mobilization, U. S. Interior Dept., by means of 35,000 questionnaire forms distributed through Bureau of Mines regional offices. Answers are to be based on experience during the January-June period, 1955. Forms are to be completed and returned by Feb. 15. Information gathered will be used in several areas of mobilization planning, including materials quantity requirements, facilities capacities, and analysis of dispersal problems in emergency times.

Defense contractors will get more aluminum in the second quarter than in the current quarter, but slightly less copper.

Office of Defense Mobilization is raising the quota of aluminum to be set aside for "A" products to 131,755,000 lb, 10 pct higher than the allotment for the current three months.

The allotment of copper and copper base alloys was cut to 54,619,000 lb, down 9 pct from the first quarter.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Jan. 18	Jan. 19	Jan. 20	Jan. 21	Jan. 23	Jan. 24
Copper, electro, Conn.	43.00	43.00	43.00	....	43.00	43.00
Copper, Lake, delivered	43.00	43.00	43.00	....	43.00	43.00
Tin, Straits, New York	104.25	104.75	104.75	104.125	104.00	104.00
Zinc East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	16.30	16.30	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

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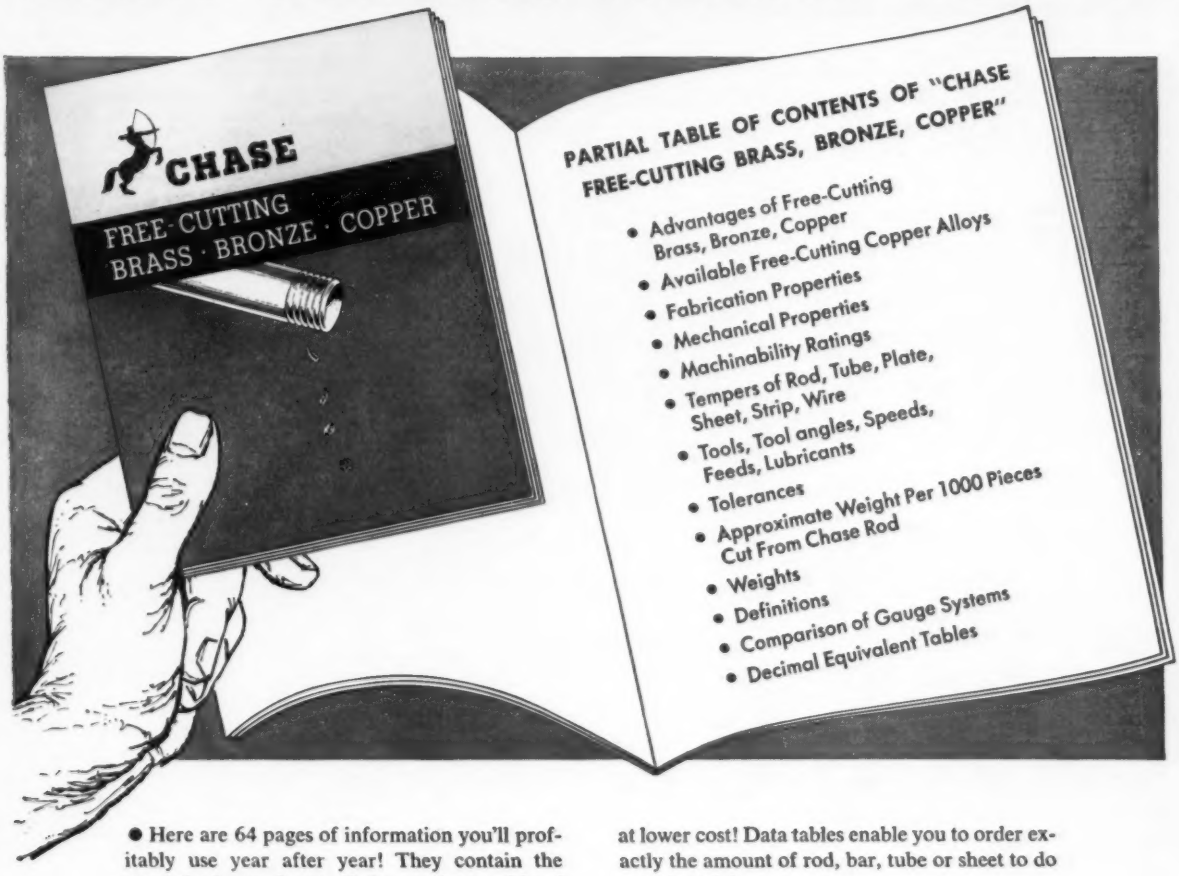
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• Fabrication Properties
• Mechanical Properties
• Machinability Ratings
• Tempers of Rod, Tube, Plate, Sheet, Strip, Wire
• Tools, Tool angles, Speeds, Feeds, Lubricants
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NAME .....
POSITION .....
FIRM .....
STREET .....
CITY ..... STATE.....

Nonferrous Prices *(Effective Jan. 24, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003	40.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	41.6-43.3	56.6-60.2
12-14	42.3-43.7	57.5-61.8
24-26	45.3-45.7	67.7-72.1
36-38	53.6-54.2	90.5-94.3

Screw Machine Stock—2011-T-3

Size"	¼	⅜-½	⅝-1	1¼-1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1.295	$1.727	$2.160	$2.590
.024 gage	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ½ to ¾ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ⅝ diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.59 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.625; 5/16 to ⅜ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD ⅝ to ¾ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	63.13	....	63.48
Copper, h-r	58.76	59.11	....
Copper, drawn	....	60.36	....
Low brass	57.75	58.29	....
Yellow brass	53.60	53.54	....
Red brass	59.24	59.18	....
Naval brass	52.83	51.41	48.40
Leaded brass	....	....	48.42
Com. bronze	61.28	61.82	....
Mang. bronze	59.39	53.38	54.94
Phos. bronze	82.51	81.50	....
Muntz metal	53.74	49.55	50.80
Ni silver 10 pct	66.00	68.33	70.68

Beryllium copper Cr, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.84
Rod, bar, wire	1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless Tube	122	110	153
Shot, Blocks	...	71	...

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb conta'd Be	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	43.06
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $120
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$278 to $280
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$23 to $24
Platinum, dollars per troy oz.	$97 to $107
Silver, New York, cents per troy oz.	90.50
Tin, New York	104.00•
Titanium sponge, grade A-1	$3.15 to $3.45
Zinc, East St. Louis	13.50
Zinc, New York	14.00
Zirconium, sponge	$10.00

• Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	42.00
No. 120	41.25
No. 123	40.50
80-10-10 ingot	
No. 305	45.75
No. 315	44.00
88-10-2 ingot	
No. 210	58.25
No. 215	54.75
No. 245	48.75
Yellow ingot	
No. 405	33.25
Manganese bronze	
No. 421	37.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	32.75-34.00
0.60 copper max.	32.50-33.75
Piston alloys (No. 122 type)	32.75-33.75
No. 12 alum. (No. 2 grade)	31.50-32.25
108 alloy	31.50-32.00
195 alloy	33.00-34.00
13 alloy (0.60 copper max.)	32.50-33.75
AXS-679	31.50-32.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	$1.50-32.75
Grade 2—92-95%	30.50-31.75
Grade 3—90-92%	30.00-31.00
Grade 4—85-90%	29.25-30.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38¼
Yellow brass	28⅞	26⅝
Red brass	34¼	33⅛
Comm. bronze	35⅝	35
Mang. bronze	27	25¾
Yellow brass rod ends	28⅝	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42
No. 2 copper wire	40½
Light copper	38
•Refinery brass	37½—38

• Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42
No. 2 copper wire	40½
Light copper	38
No. 1 composition	34½
No. 1 comp. turnings	34
Hvy. yellow brass solids	24⅛
Brass pipe	28
Radiators	26
Aluminum	
Mixed old cast	21½—22⅛
Mixed new clips	22 —23⅛
Mixed turnings, dry	21½—22⅛

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	39½—40
No. 2 heavy copper and wire	37 —37½
Light copper	35 —35½
New type shell cuttings	34 —34½
Auto radiators (unsweated)	23 —23½
No. 1 composition	30½—31
No. 1 composition turnings	28½—29
Unlined red car boxes	24½—25
Cocks and faucets	24 —24½
Clean heavy yellow brass	19½—20
Brass pipe	24½—25
New soft brass clippings	25 —25½
No. 1 brass rod turnings	23 —23½

Aluminum

Alum. pistons and struts	18 —18½
Aluminum crankcases	16¾—17¼
1100 (2S) aluminum clippings	20½
Old sheet and utensils	16¾—17¼
Borings and turnings	11½—12
Industrial castings	16¾—17¼
2024 (24s) clippings	18½—19

Zinc

New zinc clippings	8½— 9
Old zinc	6 — 6½
Zinc routings	4¼
Old die cast scrap	3½

Nickel and Monel

Pure nickel clippings	$1.50
Clean nickel turnings	$1.25
Nickel anodes	$1.50
Nickel rod ends	$1.50
New Monel clippings	60
Clean Monel turnings	50
Old sheet Monel	55
Nickel silver clippings, mixed	25
Nickel silver turnings, mixed	21

Lead

Soft scrap lead	12½—13
Battery plates (dry)	6¾— 7
Batteries, acid free	4½

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	81 —82
No. 1 pewter	64 —65
Auto babbitt	43½—44½
Mixed common babbitt	15½
Solder joints	20¾—21¼
Siphon tops	50
Small foundry type	16¼—16½
Monotype	14¾—15¼
Lino. and stereotype	14 —14½
Electrotype	12¼—12¾
Hand picked type shells	10½—11
Lino. and stereo. dross	5¾— 6
Electro. dross	4¾— 5

IRON AGE

STEEL PRICES

(Effective Jan. 24, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1 A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7 A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C16*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Jan. 24, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *10* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.025 *A5, N4, R3*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1, Y1*	$7.90 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5 P6*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.825 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.825 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.275 *S2*			

IRON AGE

STEEL PRICES

(Effective Jan. 24, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mass.			6.35 *W11* 6.45 *C14* 6.80 *B5*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,L2* 6.25 *B5, W8, W10*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.80 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.15 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.80 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3* 6.25 *B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1, Y1, C10,R3*	4.65 *U1, Y1, R3*	5.90 *Y1, U1*	5.575 *U1, Y1, C10*	7.425 *Y1,C10 F2*	6.80 *U1, Y1*	4.50 *U1, Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.50 *S2*

Steel Prices *(Effective Jan. 24, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	7.00	+2.25	10.00	+8.25	12.50	+4.75	15.00	+3.00	15.50	+2.00	16.00	+1.50	17.50	+0.75								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	11.50		15.50		17.50		18.00		18.50		19.00		19.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2¼ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .43
Special carbon ..... .39
Extra carbon ..... .33
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 38.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1956 season. Freight for buyer's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.10
Mesabi, nonbessemer	10.95
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	...	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	...	7.40	7.80
Atlanta *A8*	154	167	...	175	180	7.50	8.025
Bartonville *K2**	154	168	...	175	181	7.50	8.075
Buffalo *W6*	...	...	...	...	...	7.40	7.80
Chicago, Ill. *N4***	152	166	...	173	179	7.40	8.00
Cleveland *A6*	157	...	...	...	...	7.40	.....
Cleveland *A5*	...	...	...	...	...	7.40	.....
Crawfordsville *M4**	154	167	...	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	...	173	175	7.40	7.80
Duluth *A5*	152	162	...	173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162	...	173	175	7.40	7.80
Galveston *D4*	157	...	...	...	...	...	.....
Houston *S2*	167	170	...	...	180	7.65	8.05
Johnstown, Pa. *B3**	152	166	...	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	...	173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154	...	175	177	7.50	7.90
Los Angeles *B2**	...	...	...	...	...	8.35	8.925
Kansas City *S2*	167	174	...	178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	...	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	...	.....
Pittsburg, Cal. *C7*	171	185	...	...	195	8.35	8.75
Portsmouth *P7*	...	...	...	...	...	7.40	.....
Rankin, Pa. *A5*	152	162	...	...	175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	...	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	...	175	181	7.50	8.075
Struthers, O. *Y1*	...	...	...	...	...	7.40	7.90
Worcester *A5*	158	...	...	...	...	7.70	.....
Williamsport, Pa. *S5*	...	...	160	...	...	.....	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*	...	...	10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	...	9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	.....
Detroit *D2*	7.20	9.15	10.70	...	.....
Harrison, N. J. *C11*	...	...	10.80	12.95	15.65
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	.....
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*	...	...	...	...	.....
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	...	.....
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (18 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	10	7.93	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.70	8.81–9.36	10.27	7.94–7.96	10.30	7.89	8.13	7.83	9.53	12.15–13.80	13.40–13.45	16.65	16.50
Buffalo	.30	7.05	8.30	10.00	7.35	.....	7.35	7.60	7.35	7.90	.....	13.10	.....	16.15
Chicago	.25	7.15	8.39	8.80	7.36	.....	7.29	7.58	7.42	7.75	13.20	12.85	16.05	15.90
Cincinnati	.25	7.27	8.38	9.20	7.60	.....	7.58	8.05	7.66	8.05	13.44	13.09	16.29	16.14
Cleveland	.30	7.15	8.39	9.10	7.46	.....	7.46	7.91	7.48	7.85	.....	12.91	.....	15.96
Denver	.....	8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.25	6.99	8.28	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston	.....	7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.05	10.00	11.00	8.35	.....	8.05	8.30	8.05	10.70	.....	14.25	.....	17.85
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.25	7.24	8.48	8.89	7.45	.....	7.38	7.75	7.51	7.94	.....	12.94	.....	15.99
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.46	8.68	9.44	8.07	11.10	7.76	7.99	7.96	9.48	13.63	13.28	16.48	16.33
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.14	8.42	9.35	7.67	.....	7.37	7.74	7.64	8.46	13.36–13.51	13.16	16.36	16.21
Pittsburgh	.25	6.80	8.09	9.20	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland	.....	7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.10	9.65	10.15	8.35	.....	8.05	8.25	8.05	11.20*	.....	14.25	.....	17.85
Seattle	.00	8.55	10.40	10.80	8.65	.....	8.20	8.30	8.35	11.70	.....	14.60	.....	17.65
St. Louis	.25	7.44	8.68	9.49	7.65	.....	7.58	7.98	7.71	8.14	13.69	13.14	16.35	16.19
St. Paul	.25	7.46	8.59–9.14	9.16	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

(Effective Jan. 14, 1958)

RAILS, TRACK SUPPLIES

f.o.b. Mill Cents Per Lb	No. 1 Std Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer UI	4.725	5.65	5.825				
Ga. Chicago R3				7.90			
Kenley Y2	4.725	5.65					
Fairfield Y2		5.65		7.90		5.625	
Gary UI	4.725	5.65				5.625	
Ind. Harbor I3	4.725		5.825	7.90		5.325	
Ind. Harbor Y1				7.90			
Johnstown B3		5.65					
Joliet UI		5.65	5.825				
Kansas City S2				7.90			
Lackawanna B3	4.725	5.65	5.825			5.625	
Minnequa C6	4.725	4.15	5.825	7.90		5.625	12.40
Pittsburgh O1					11.90		12.40
Pittsburgh P1							12.40
Pittsburgh J3				7.90			
Seattle E2				8.40		5.775	12.90
Steelton B3	4.725		5.825			5.625	
Struthers Y1				7.90			
Torrance C7						5.775	
Williamsport S5		5.65					
Youngstown R3				7.90			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $14.00 to $14.50
Foundry, beehive (f.o.b. oven)
Connellsville, Pa. ..... $16.00 to $16.50
Foundry, oven coke
Buffalo, del'd $28.08
Chicago, f.o.b. 25.75
Detroit, f.o.b. 26.25
New England, del'd 28.55
Seaboard, N. J., f.o.b. 25.50
Philadelphia, f.o.b. 25.00
Swedeland, Pa., f.o.b. 25.00
Plainesville, Ohio, f.o.b. 25.50
Erie, Pa., f.o.b. 25.00
Cleveland, del'd 27.42
Cincinnati, del'd 26.56
St. Paul, f.o.b. 22.75
St. Louis, f.o.b. 24.00
Birmingham, f.o.b. 24.60
Lone Star, Tex., f.o.b. 19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 58.92
Electrodeposited 55.25
Brass, 80-20, ball anodes, 2000 lb or more 58.00
Zinc, ball anodes, 2000 lb lots 20.75
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon .. 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical. $1.06 to $1.10

Chemicals

(Cents per lb, fob shipping point)

Copper cyanide, 100 lb drum 83.50
Copper sulphate, 5 or more 100 lb bags, per cwt 18.15
Nickel salts, single, 4-100 lb bags .. 33.25
Nickel chloride, freight allowed, 300 lbs 43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums 21.55
(Philadelphia add .50 per lb)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100 lb drums 31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

⅝" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1⅛" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P Hex regular & hvy

⅝" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1⅛" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

⅝" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	22

Cap Screws

	Discount H.C. Heat	
	Bright	Treated
New std. hex head, packaged		
¼" thru ½" diam. x 6" and shorter	24	20
9/16 and ⅝" x 6" and smaller and shorter	21	16
¾", ⅞", 1" x 6" and shorter	9	+11
New std. hex head, bulk*		
¼" thru ½" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	43	39
¾", ⅞", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Stove Bolts
Packaged, package list		27	38
Bulk, bulk list			
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
Packaged, package list		24	27
Bulk, bulk list			
⅜-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.2
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Dec. 1933 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) $122.00
No. 1 Ohio ....
Sec. quality, Pa., Md., Ky., Mo., Ill. 114.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	126.00
Chicago District	126.00
Western, Utah	144.00
California	151.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	23.00
Silica cement, net ton, bulk, Utah and Calif.	22.00

Chrome Brick

Per net ton

Standard chemically bonded, balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick

Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite

St. ¾-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	40.00
in sacks	46.00

Dead Burned Dolomite

Per net ton

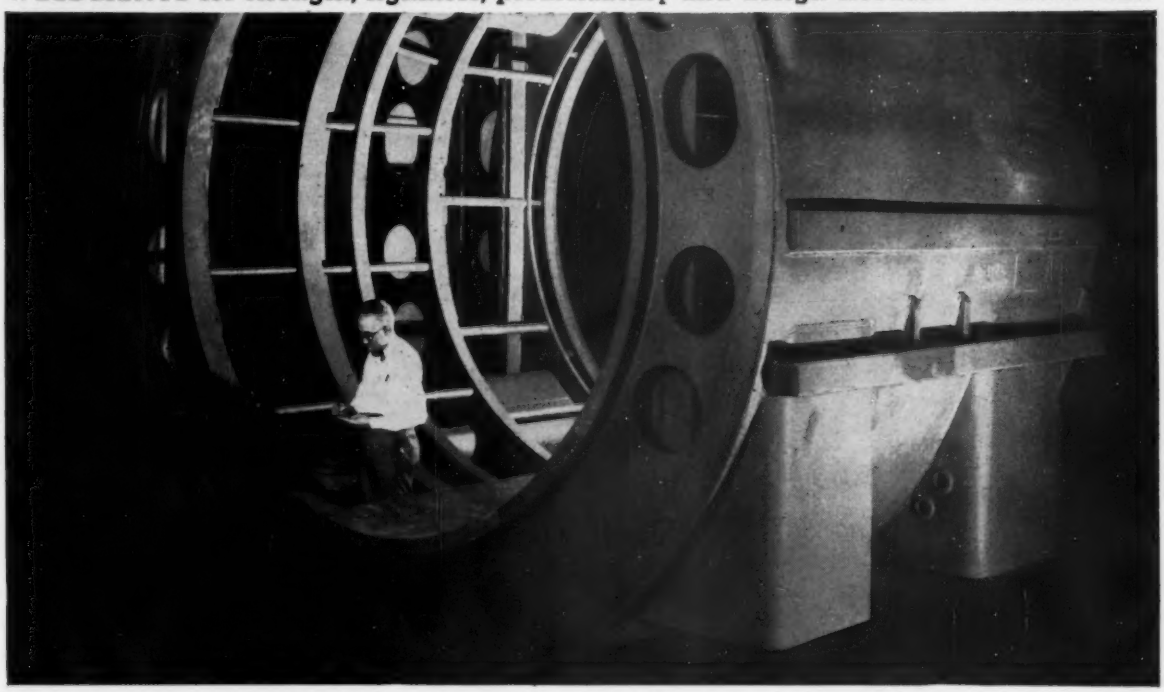
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge, iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	37.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	34.50¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	61.50¢
Copper, reduced	61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.15
Silicon	43.50¢
Solder powder .7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.20
Zinc, 10 ton lots	18.75¢ to 32.50¢

WELDMENTS for strength, lightness, predictability and design freedom — at lower cost!



ELECTRICAL GENERATOR FRAME: End section of a three-piece stator frame built by Lukenweld for General Electric. This type of welded structure provides remarkable rigidity and strength at critical points with a minimum of weight.

LUKENWELD QUALITY WELDMENTS OFFER YOU A UNIQUE COMBINATION OF ADVANTAGES

Lukenweld welcomes orders for the really big and challenging weldments. The most extensive facilities and longest experience of any commercial weldery in the country combine to save you money and time. Here's how...

DEPENDABILITY The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

RELIABLE SOURCE OF MATERIALS Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

CONSULTATION SERVICE Metallurgical, design engineering, related services are available on your job.

FINISHING FACILITIES Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

EXPERIENCE Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

FOR INFORMATION on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 818 Lukens Building, Coatesville, Pa.

LUKENWELD LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA

Ferroalloy Prices

(Effective Jan. 24, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C ...	38.50	0.20% C ...	35.50
0.06% C ...	36.50	0.50% C ...	35.25
0.10% C ...	36.00	1.00% C ...	34.00
0.15% C ...	35.75	2.00% C ...	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si. ... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.00% Si 25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	38.65
Ton lots	30.55
Less ton lots	32.05

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe..	1.36

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	24.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.25
Johnstown, Pa.	10.25
Sheridan, Pa.	10.25
Philo, Ohio	10.25
S. Duquesne	10.25

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.50
Ton lots packed	14.70

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$89.50
19 to 21%	3% max.	91.50
21 to 23%	3% max.	94.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, Packed	45.75
Ton lots	44.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 22.35

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	35.55	36.75
0.07% max. C	30.95	33.50	34.70
0.15% max. C	29.45	32.00	33.20
0.30% max. C	27.95	30.50	31.70
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	11.20
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.70
Ton lots, packed	14.90

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe ...	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

50% Si ...	12.75	75% Si ...	15.40
65% Si ...	14.50	85% Si ...	17.10
	90% Si ...	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta..... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Sigio, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $3.30

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.33
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si 40-45%, per lb contained 2 .... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound ...	50¢

Corbortam, Ti 15-21%, B 1-2% Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots 1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over

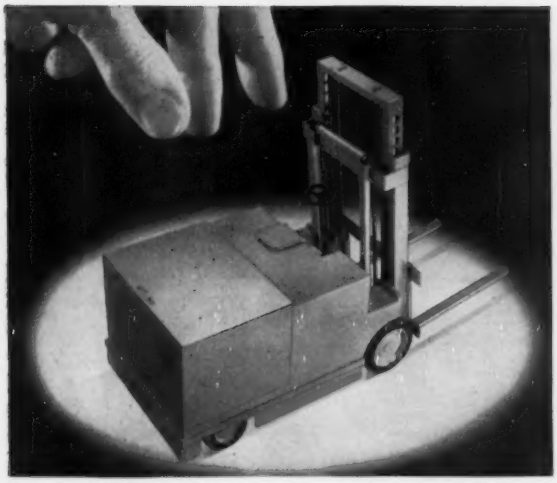
No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.40
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

Silcra, contract basis, delivered.
Ton lots ..... 45.00¢



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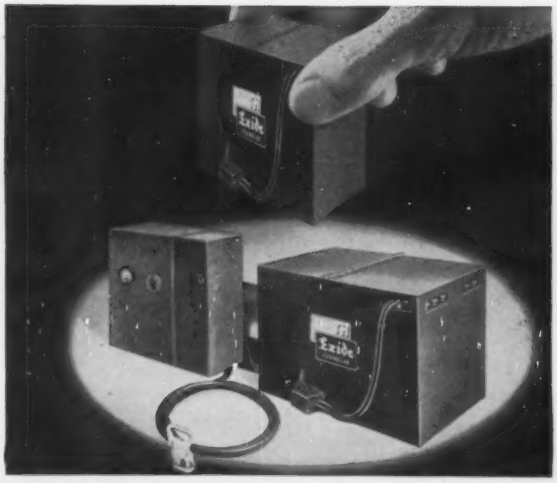

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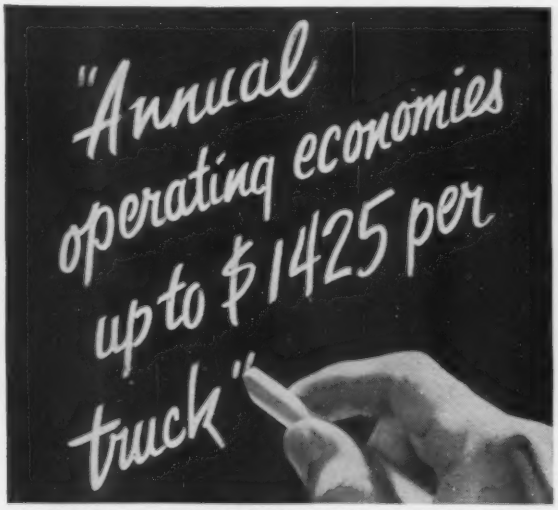
SAVE UP TO 33% CASH OUTLAY. This new Exide leasing plan brings initial cost for electric trucks down within range of trucks using any other kind of power.



PAY BATTERY LEASING COSTS OUT OF OPERATING ECONOMIES. Exide-powered electric trucks cost less to own and operate. Savings are tremendous!

SAVE UP TO 33% CASH OUTLAY ON ELECTRIC TRUCKS

New Exide leasing plan points the way to lower materials handling costs

Look how many ways Exide-powered electric industrial trucks can save you money just through operating economies: no wasted power when the truck is stopped; faster handling of materials; no unscheduled downtime; no high repair bills. *Added safety feature*—no bothersome fumes or noise. You pay for Exide power as you use it—the same as with other forms of power. But electric trucks give you over twice the operating life. Additional shifts multiply the economies.

Now you can have all these advantages at a new low initial investment—through the Exide leasing plan. And you get famous Exide-Ironclad heavy duty batteries with the unique positive plate. Electrolyte flows easily through slotted power tubes to reach more active material faster. Result: an Exide-Ironclad delivers more power quicker for a longer time at lower cost.

Get all the facts and figures on how the Exide leasing plan can meet your particular requirements. Call your Exide sales representative. Talk with any electric truck salesman. Send the coupon.

Exide

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Exide Industrial Division
The Electric Storage Battery Company
Phila. 2, Pa.

Send me details on the new plan for cutting cash outlay on electric trucks.

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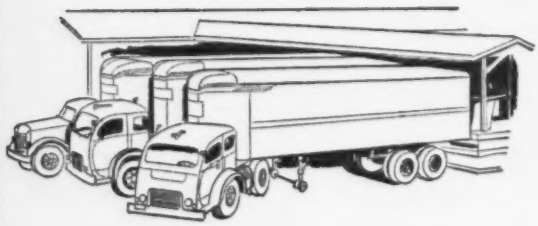
Roy Fruehauf, President, Fruehauf Trailer Company



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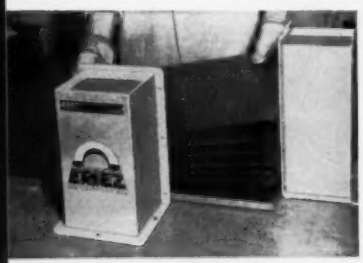
offer new automation advantages

● A revolutionary new concept in steel conveying and controlling is now possible through the use of Eriez Permanent Non-electric Magnets. Famous for years as magnetic separators to remove tramp iron from processing lines of all kinds, the introduction of these magnets into the metal working industry has offered many new ideas in automation. Powerful enough to stop moving metal, these magnets can also convey pipe, tubes, conduits, sheet metal, etc., at high speeds to maintain peak production. Other advantages include: faster pickup, more positive movement, less conveyor space needed, less product damage caused by slippage and sag, elimination of electric motors, etc. *All Eriez Magnets are non-electric, self-contained. They have no wires or attachments. There is no operating cost; first cost is the last. Powerful Alnico V elements are guaranteed to keep their strength indefinitely.*

Write for Big New "MAGNETS FOR METAL WORKING" Bulletin.

Magnetic ideas from ERIEZ HI-POWR ERIEZ



ERIEZ SHEET FANNER MAGNETS. Here's the magnet to speed up sheet metal handling and increase production. Slow, costly hand separation is completely eliminated . . . no more double feeding, no scratched surfaces, no cut fingers. An Eriez Sheet Fanner Magnet placed next to a pile of sheet metal *automatically* lifts the top sheet into the air, allows fast, safe removal. When this sheet is removed, the following one automatically rises. Ideal for irregular, odd-shaped sheets. Available in five strengths.

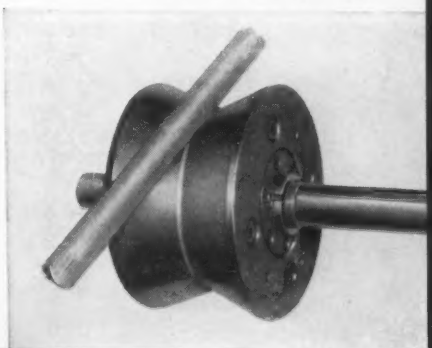
ERIEZ SMALL-DIAMETER MAGNETIC ROLLS (flat-faced). These powerful, permanent magnetic rolls are destined to play a major part in plant automation. Installed either singly or in groups, they are used for feeding, conveying and spot control of sheet metal and they assure absolute control during such operations as baking, painting, trimming, etc. They eliminate drifting, untrue cuts, cobbles . . . reduce downtime and rejects. They permit automatic feeding of stock for cutting, punching and shearing operations. Rolls can be coated for special needs, or chrome plated for longer wear. In $2\frac{1}{2}''$, $4''$, $4\frac{3}{8}''$ and $5''$ diameters. Easily installed on present systems.

ERIEZ CONTROL PLATE MAGNETS (flat-faced). Designed for installation under fast-moving belts, powerful plate magnets are used to control moving sheets and keep them in proper position during conveying operations. True feeding into machinery is assured, and there's never a chance of flopping or "take-offs." Constant magnetic power prevents sheets from damaging each other, reduces rejects and waste. Available in various sizes and strengths, in widths from $4''$ through $72''$, in $2''$ increments. Readily adaptable to existing conveyor lines.

Eriez "Magnetic Ideas" can help you. Eriez factory-trained field men, backed by extensive laboratory and engineering know-how, will be happy to study your particular metal handling problem and offer helpful "Magnetic Ideas." Our representatives are always glad to work with your engineering department or consulting engineers on any problem, large or small. For additional information concerning magnetic problems in the metal working industry, write for new bulletin B-207. Address Eriez Manufacturing Company, 100A Magnet Drive, Erie, Pennsylvania.

AND HOLDING ON BY A MAGNET. There's quite a drop beneath this worker . . . but he's in no danger. He is holding on by a permanent-powered Eriez Magnet. This idea of permanent dependability and herculean power now offers the metal working industry many new ideas for automatic control and conveying of steel. Hundreds of other production problems have also been solved by the use of many types of Eriez Permanent Magnets designed to separate, retrieve and purify.

ERIEZ V-TYPE MAGNETIC PIPE CONTROL ROLLS. These V-grooved rolls are used to control and convey pipe from one location to another, either horizontally, vertically or up steep inclines at speeds that permit capacity production. They decrease take away time, make for shorter conveyor lines, and eliminate many direct drive rolls and motors. Positive hold prevents rebound, assures absolute control during all operations such as cut-off, reaming and facing, coupling, threading, and conveying through coating operations. Available for medium and heavy duty.



HARLLEE BRANCH, JR. *Portrait by Fabian Bachrach*

"We consider it a privilege to make the Payroll Savings Plan available to all our people"

As President of Georgia Power Company, Mr. Harllee Branch, Jr., can be proud of his company's Payroll Savings Plan—more than 50% of Georgia Power's employees are Payroll Savers. They are putting more than $423,000 into U.S. Savings Bonds each year. But, Mr. Branch's interest goes beyond his own company Plan. A few months ago, as President of the Edison Electric Institute, he asked all the 185 member companies in the electric utility industry to join in an industry-wide effort to increase employee percentages in their Payroll Savings Plans.

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PRECISION WAY to hob gears up to 23 ft. diameter

SCHIESS RF GEAR HOBBERS

Tremendous! Yes—and newly designed! Cut mammoth gears from 9 ft. to 23 ft. diameter with "lightweight" precision! Spur, helical and herringbone gears (including internal gears). Also wormwheels of either low- or high-lead angle.

Accurately centered fixed table supports blanks ranging from 20 to 80 tons. Moving column adjustable for both diameter of gear and depth of tooth. Cuts in either upward or downward direction. Huge master wormwheels assure accuracy of indexing movement. Tooth pressures of worms offset each other—no lateral stress.

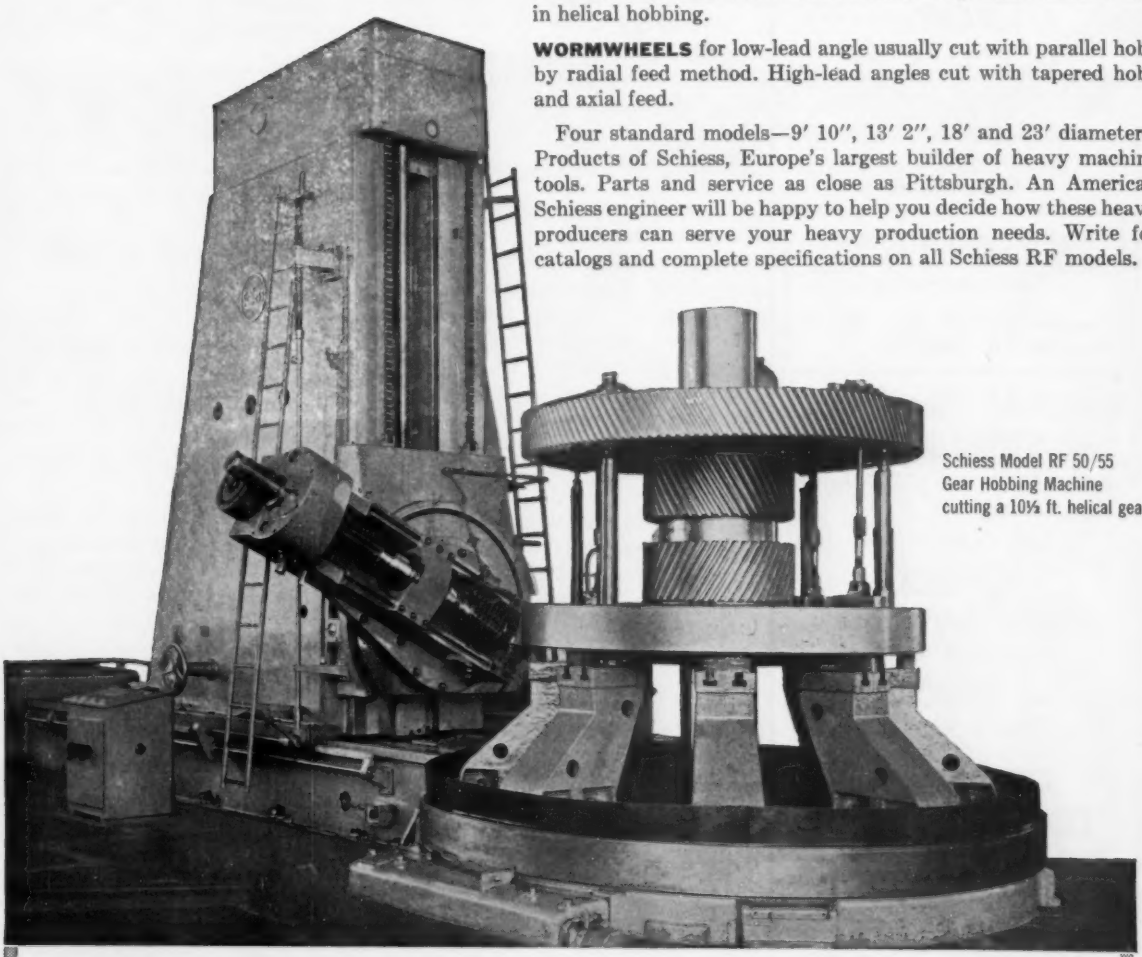
SPUR GEARS cut by driving work table through index change gears connecting with hob spindle drive.

SINGLE HELICALS (or double helicals with teeth separated by gap) produced by additional table movement—by means of differential gear provided with change gears.

HERRINGBONES cut with end mills by means of single indexing method. Additional table motion achieved by same method used in helical hobbing.

WORMWHEELS for low-lead angle usually cut with parallel hobs by radial feed method. High-lead angles cut with tapered hobs and axial feed.

Four standard models—9′ 10″, 13′ 2″, 18′ and 23′ diameters. Products of Schiess, Europe's largest builder of heavy machine tools. Parts and service as close as Pittsburgh. An American Schiess engineer will be happy to help you decide how these heavy producers can serve your heavy production needs. Write for catalogs and complete specifications on all Schiess RF models.



Schiess Model RF 50/55 Gear Hobbing Machine cutting a 10½ ft. helical gear.

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Detroit Business Looks Good . . . Demand for certain types of machine tools continues to be excellent in the Detroit area.

There is no letup in calls for all types of late model presses. A shortage still exists and this is mainly due to the special features customers are demanding. The fact that there is no longer any such thing as a standard type press makes it increasingly hard to stock them.

The same is true for tool room equipment. Good, late model shapers, grinders and lathes are very much in demand from small job shops in the area.

Some Dealers Unhappy . . . Some dealers are not happy about the prices machines are bringing at auctions. The complaint is that they can't sell a used machine for the same price they are forced to pay at an auction.

For example, at one recent sale, a used surface grinder sold for $1,750 compared to a regular price of $1,886 for a brand new machine.

The active bidding at the sales, plus the resulting high prices, is taken as an indication of just how badly tool room equipment is needed here.

Don't Want Older Pieces . . . There is hardly any activity in older types of machines. Most dealers won't even consider handling a piece of equipment today if it is any older than a 1947 model.

Reason is the lack of calls for the machines and the spectacular engineering advances that have been made in machine tools in recent years.

Everybody in Detroit admits that 1955 was a good year for business. Most expect 1956 to be just as good, if not a little bit better.

Main reason for the optimism is the huge 1957 automotive program which is just getting into high gear. Also, most dealers believe that election years are always good for all types of business.

Some Find Profits Low . . . With sales levels high, a handful of relatively large Chicago firms find profits extremely low. The upshot: a probable continuing increase in used tool prices through first quarter '56, with perhaps further upward readjustments later in the year.

Right now, the Chicago sales outlook appears excellent. Tools are in no great supply and most dealers admit to a barer shop floor than they like to show a customer. Demand for tools, both in sales and inquiries, continues extremely strong.

Demand Is Varied . . . Demand is across the board: drill presses, press brakes, turret lathes, and it's coming to the point where several good bids will be received on almost anything that resembles a milling machine.

The demand rate is just as hot for light equipment down to punch presses, and all the way up to high-production specialized drills. There's also heavy pressure for electrical equipment, handling equipment, and mill equipment.

To date, the greater share of dealer bidding at auctions has been to cover a customer order. This can be figured as pretty well out the window as of the turn of the year.

The current market outlook for the next three months is regarded as strong enough for buying over and above existing customer orders. If you've got the equipment, you've got every chance in the world of selling it. If you haven't got it, you may lose a potential sale. Biggest sales potential is with the firm which has good stocks, and wants more.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLLS
1¾"x1¾"x⅜" Niagara No. 3
4½"x4½"x⅝" Amplex PBR Horizontal

BALERS
#123P-66 Logemann, Charging Box 66x18x24. Produces Bale 125 to 150 lbs.
Logemann Baler, Charging Box 72x12x18". Produces 500 lb. Bale

BENDING ROLLS
8' x 3/16" Milton Slip Roll Forming Machine
10' x 1¼" Bertsch Initial Type
16' x ¾" Bertsch Initial Type Bending Roll
24' x ½" Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
12' x ⅜" Dreis & Krump
12' x ¼" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
10' x ⅝" Cincinnati #130-10
12' x 5/16" Pacific Hydraulic, 300 ton

BROACH
Model VP-4-40-40 American Vertical Hydr. Broach. Max. Capacity 60 ton, Stroke 40", Motor Drive

BULLDOZER
#27 Williams & White, 22" Stroke, 16" x 80" Face of Crosshead

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10 ton P&H	58' Span 230 Volt D.C.
10 ton Milwaukee	80' Span 230 Volt D.C.
With 5 ton Auxiliary	
10 ton P&H	96' Span 220 Volt D.C.
15 ton P&H	56' Span 230 Volt D.C.
20 ton P&H	60' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
30 ton Alliance	50' Span 230 Volt D.C.
With 10 ton Auxiliary	
120 ton Whiting	80' Span 230/3/60 A.C.
With 10 ton Auxiliary	

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1" to 5" Acme, Ajax, National
1", 4", 5" National High Duty, Air Clutch

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Lee Wilson Natural Gas Annealing Furnace. Work Dimensions 42" coil, 96" Piling Height
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72" McKay 15 Rolls 4¼" Dia.

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300 ton United Steam Hydr. Forging Press
530 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke, Bed Area 72" x 146"
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2045 ton Birdsboro, 4 Columns, 14" Stroke Platen 42" x 40" Daylite 47"
4500 ton B-L-H Hydr. Forging Press

PRESS—Straight Side
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⅛" Quickwork Whiting #04A—NEW 1953

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12' x 316" Cincinnati #1412
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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3000	Whse.	Tandem	550	600
1	2200	G.E.	MCF	600	400/500
2	1500	Whse.	Rev.	600	600
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
3	450	Whse.		550	415
1	350	Whse.		250	325/650
1	250	G.E.	MPC	230	400/600
1	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
3	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	8K-151B	230	900/1800
1	150	Whse.	8K-201	230	360/950
1	120	G.E.	MCF	230	250/1000
1	125	Whse.	8K-182	230	850
1	100	Rel.	1050T	230	400/1200
2	100	Whse.	8K-181	230	450/1000
2	100	Whse.	8K-181	230	450/1000
2	75	C.W.	53H-TEFC	230	860
1	50	G.E.	MD-412AE	230	550

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500 25cg	660	11000
1	2000	G.E.	514	600	6600/13200
1	1500	G.E.	720	600	6600/13200
1	750	Whse.	900	250	2300/4000
1	600	G.E.	720	250	440/2300
1	500	Whse.	900	125/250	440
1	300	Whse.	1200	250	208/440/550
1	200	Whse.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	2500	A.C.	OA	3	6900/11900x2400/4160Y
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	13800x2300
3	333	G.E.	HS	1	7200x2400/4160Y
3	333	G.E.	HD	1	13200x2300
3	333	G.E.	HSWR	1	2300/4000x230/450
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2	1250	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
1	200	G.E.	1200	250	2300
1	150	G.E.	1200	250	2300
1	100	Whse.	990	250	2300

LARGE MILL MOTORS

Qu.	H.P.	Make	R.P.M.	Volts	Type
2	3000	Whse.	600	525	tandem
6	1500	Whse.	600	525	Encl.
1	1250	G.E.	350/700	600	MCF-6
4	800	Whse.	600	525	Encl.
4	700	Whse.	300/700	250	Encl.
2	600	Al. Ch.	300/600	600	Mill
1	250	Al. Ch.	250/1000	250/375	Mill

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Constant Duty, 3 Phase, 60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	1500	G.E.	MT-498	2300	360
2	1000	G.E.	M-575-8	2300	1185
1	750	G.E.	I-M	2200	400
1	500	Al. Ch.	ANY	2200	505
1	500	G.E.	I-M	2300	450
1	450	G.E.	I-14-M	2300	505
1	450	Whse.	CW	2200	440
1	400	Al. Ch.	ANY	2200	505
1	400	G.E.	MT-424	2300/440	352
1	300	Whse.	CW-1012	2200	704
1	250	Al Ch.	ANY	440	705
1	250	Whse.	CW-1106	2200	435
1	250	G.E.	MT-414	2200	300
2	200	Al. Ch.	ANY	2200	585
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ANY	440/220	705
1	150	Whse.	CW	440/220	490
1	150	Whse.	CW-1000	440/220	435
1	100	Whse.	CW	440/220	870
1	100	El. Dy.	EDY-612	2300	900
1	100	G.E.	MT-558	440/220	700
2	100	G.E.	I-15-A	2200	495
1	100	Al. Ch.	ANY	440/220	430

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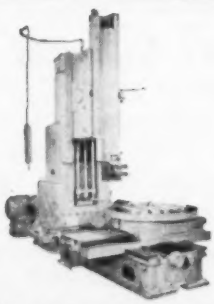

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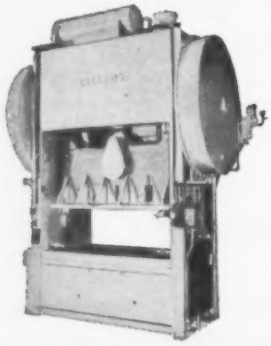

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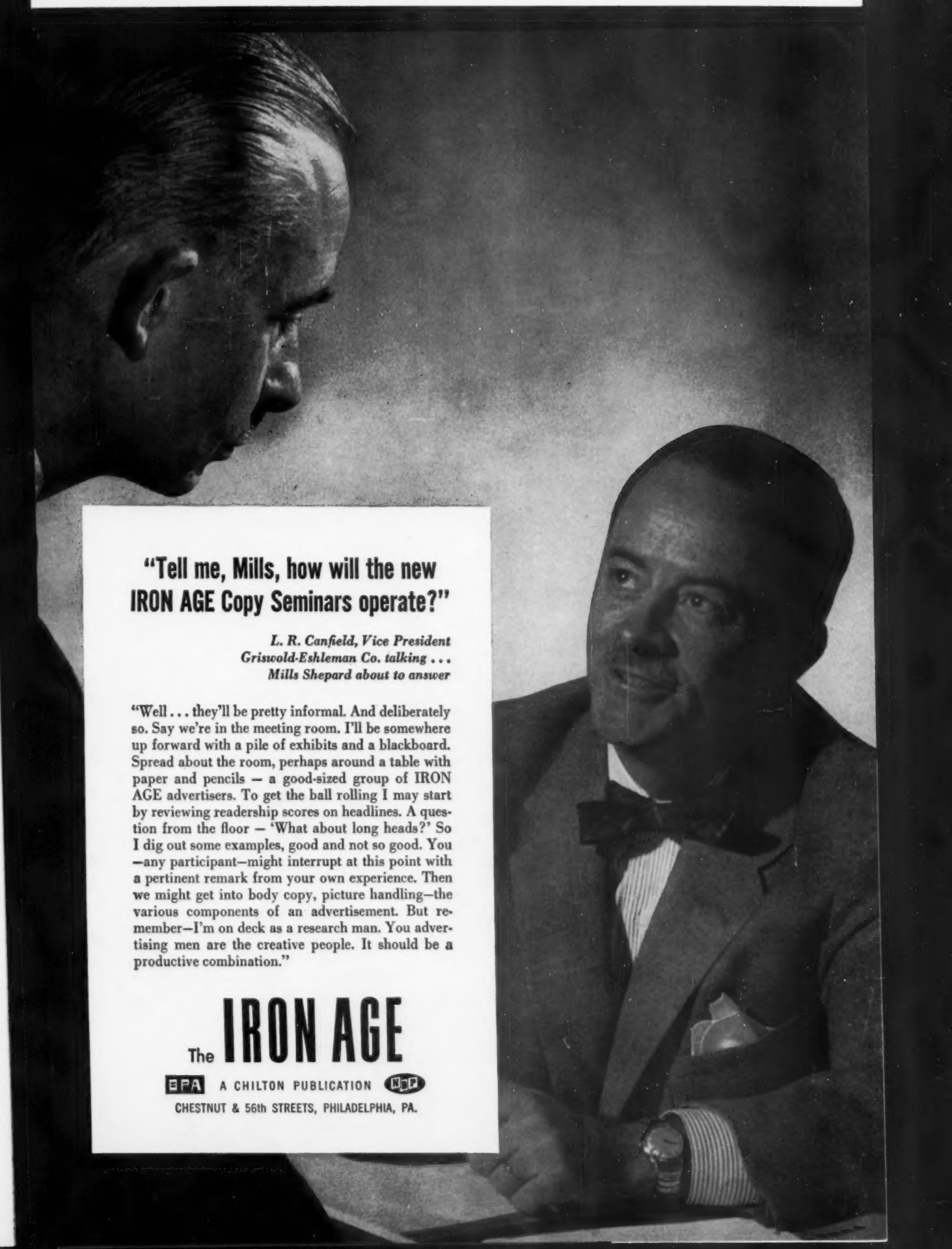

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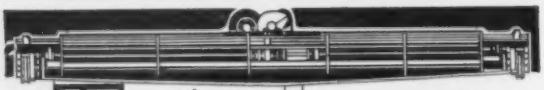

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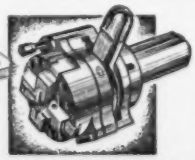
Cutting off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS

FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

H&G Insert Chaser DIE HEADS



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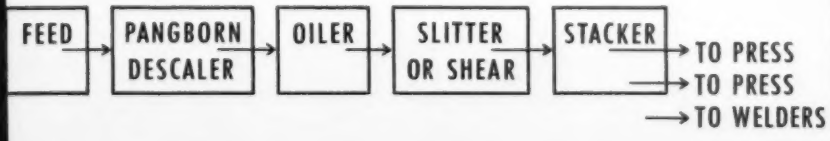

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- *You speed production.*
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- *You use minimum floor space.*

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Pangborn

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Rotoblast Blastcleaner & Continuous-Flo Barrel
Rotoblast Tables & Table-Rooms
Special Blast Rooms & Cabinets
Pangborn Dust Control Equipment
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How TIMKEN® bearings maintain spindle precision, accurate gear mesh on extra heavy-duty lathe

AT the flick of a lever, the operator of this Warner & Swasey 1-A *extra heavy-duty* lathe can get any one of 16 spindle speeds immediately. Then, with the right speed for the job, this lathe can hog off a lot of metal fast—and still turn out close-tolerance parts.

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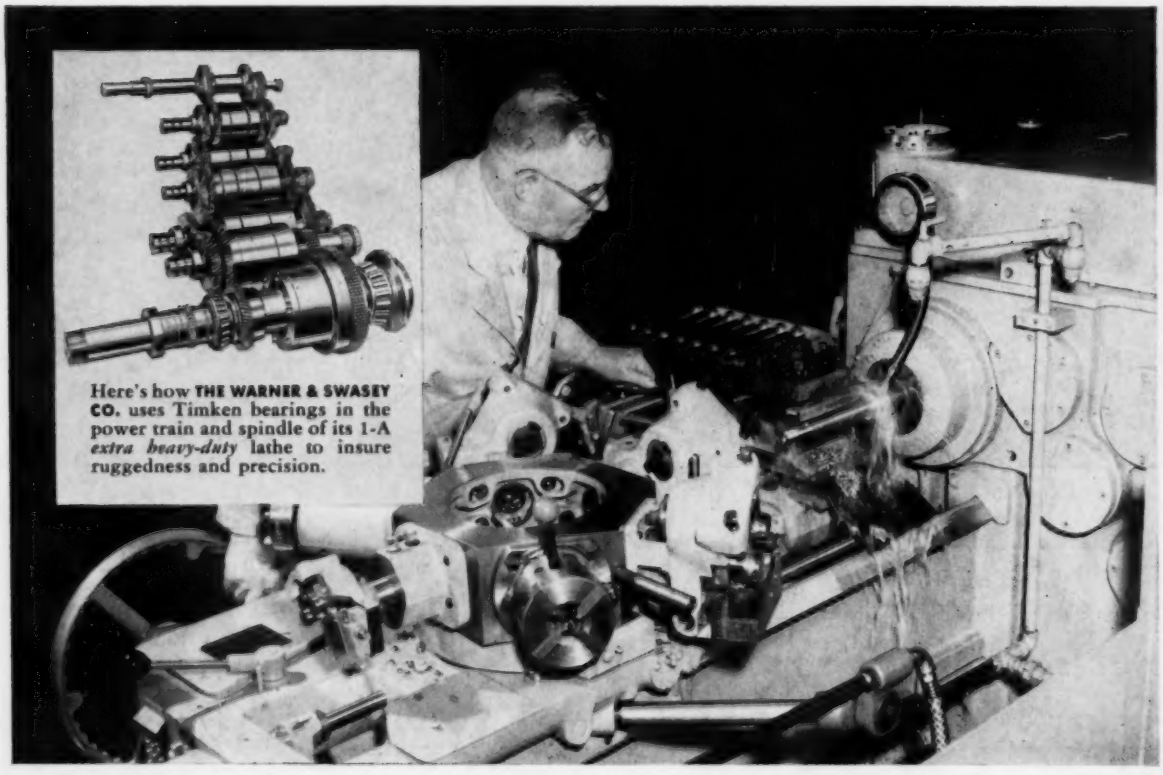
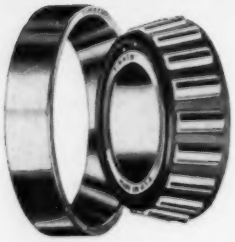
No other bearings can offer you all the advantages of Timken bearings. That's why so many manufacturers of fine equipment use them. Whether you build or buy machinery, be sure to specify Timken bearings. And look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



Here's how **THE WARNER & SWASEY CO.** uses Timken bearings in the power train and spindle of its 1-A *extra heavy-duty* lathe to insure ruggedness and precision.



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TAPERED ROLLER BEARINGS

REVOLUTIONARY BUCYRUS PLANT HELPS HOLD DOWN RISING COSTS

At a new plant in Bucyrus, Ohio, the Timken Company has substantially reduced the cost of tapered roller bearings by: 1) producing these bearings under a new system of extreme mechanization; 2) standardizing on 13 bearing sizes with the widest applications throughout industry. Manufacturers can take advantage of these lower costs by redesigning applications to use these Bucyrus sizes. And as more switch to Bucyrus bearings, production costs can drop still further, meaning even lower costs to you.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST →▯← LOADS OR ANY COMBINATION ✳